Medical Lib

Cup. 5

SEP 17 1923

Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol. 50, No. 6.
WHOLE No. 855.

RICHMOND, VA., SEPTEMBER, 1923

$2.00 A YEAR
20 CENTS A COPY

CONTENTS.

ORIGINAL COMMUNICATIONS:

Treatment of Certain Types of Goitres. Stuart McGuire, M. D., Richmond, Va. ---- 351

The Treatment of Lobar Pneumonia Due to Pneumococcus Infection. Lewellys F. Barker, M. D., Baltimore, Md. 356

Intradural Surgery in Its Relation to Abscess of the Brain. Wells P. Eagleton, M. D., Newark, N. J. ---- 367

Recent Advances in the Diagnosis and Treatment of Syphilis. Warren T. Vaughan, M. D., Richmond, Va. 372

Some Results of Protein Sensitization Work in Bronchial Asthma, Hay-Fever and Allied Conditions. Report of Cases. Grafton Tyler Brown, M. D., Washington, D. C. 379

Fever. Wyndham B. Blanton, M. D., Richmond, Va. -- 384

A Discussion of Some Phases of Mental Diseases. Jesse A. Strickland, M. D., Norfolk, Va. ---- 389

Physical Examination of the Lungs in the Diagnosis of Pulmonary Tuberculosis. Dean B. Cole, M. D., Richmond, Va. ---- 393

Prophylaxis of Tuberculosis. H. R. Edwards, M. D., Richmond, Va. ---- 395

The Differential Diagnosis of Pulmonary Tuberculosis. W. Nelson Mercer, M. D., Richmond, Va. ---- 397

Granuloma Inguinale. Clyde F. Ross, M. D., Richmond, Va. ---- 401

Empyema. J. K. Gray, M. D., Marion, Va. ---- 404

Renal Tuberculosis. W. O. Poindexter, M. D., Newport News, Va. ---- 407

Bacillus Acidophilus as a Therapeutic Agent. George F. Reddish, Ph. D., Richmond, Va. ---- 409

The Contused Abdomen. E. B. Claybrook, M. D., F. A. C. S., Cumberland, Md. ---- 411

Tracheotomy; Improved Technique. Elbyrne G. Gill, M. D., Roanoke, Va. ---- 413

The Importance of the Glandular System and a Plea for the Preservation of the Tonsils. J. E. Copeland, M. D., Round Hill, Va. ---- 414

PROCEEDINGS OF SOCIETIES ---- 416

SECRETARY'S ANNOUNCEMENT ---- 416

BOOK ANNOUNCEMENTS ---- 416

EDITORIAL ---- 417

NEWS NOTES ---- 421

OBITUARY ---- 426

FOR MEDICAL SOCIETY ANNOUNCEMENTS SEE PAGE

INDEX OF ADVERTISERS—Advertising Page 5.

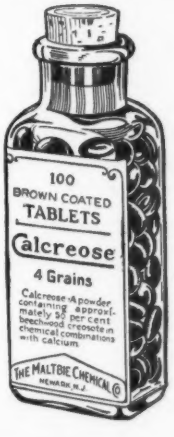
CALCREOSE

Intestinal Antisepsis

THERE is good evidence that creosote acts as an intestinal antiseptic but patients object to its use because of its taste and the untoward effect on the stomach.

CALCREOSE (calcium creosotate) is a mixture of approximately equal parts of beechwood creosote and calcium, possessing the pharmacologic activity of creosote but free from its untoward effect on the stomach, therefore,

CALCREOSE lends itself admirably to the treatment of intestinal infections in which it is desired to adminster creosote. Patients do not object to its use even when taken for comparatively long periods of time and in large doses.



TABLETS **POWDER** **SOLUTION**

Write for the "Calcreose Detail Man."

THE MALTBIE CHEMICAL COMPANY
Newark, New Jersey

Life Insurance Company of Virginia

ORGANIZED 1871

HOME OFFICE: RICHMOND, VA.

Oldest, Largest, Strongest Southern Life Insurance Company

WE WISH TO CALL ATTENTION, ESPECIALLY TO THE YOUNG MEN OF THE MEDICAL PROFESSION, TO THE ADVANTAGES OF

The ECONOMIC POLICY

This form of Insurance is especially adapted to men of moderate means with growing families, the insurance being arranged so as to give the greatest amount of protection at the time most needed and at the lowest possible premium. This policy contains a very attractive convertible clause which makes the contract elastic.

RATES FOR WHOLE LIFE—10-PAYMENT OR 15-PAYMENT ECONOMIC POLICY WILL BE QUOTED UPON APPLICATION

JOHN G. WALKER, President

LOESER'S INTRAVENOUS SOLUTIONS

THEY ARE NOT
"CURE-ALLS" *or* SPECIFICS
THEY ARE

U. S. P. and standard remedies of established therapeutic value, especially prepared for intravenous administration.

Scrupulously produced with scientific understanding of the principles involved in manufacture and administration.

Controlled by physical, chemical and physiological tests.

LOESER'S INTRAVENOUS SOLUTIONS
"Certified"

Clinical Reports, Reprints, Price Lists, and The "Journal of Intravenous Therapy" will be sent to any physician on request.

New York Intravenous Laboratory
100 West 21st Street **New York, N. Y.**

Producing ethical intravenous solutions for the medical profession exclusively.

Fifty-fourth Annual Session, Roanoke, Va., October 16-19, 1923.

Virginia Medical Monthly

Official Organ of the Medical Society of Virginia

Vol. 50, No. 6.
WHOLE No. 855.

RICHMOND, VA., SEPTEMBER, 1923

20 CENTS A COPY
$2.00 A YEAR

Original Communications

TREATMENT OF CERTAIN TYPES OF GOITRES.*

By STUART McGUIRE, M. D., Richmond. Va.

The invitation to come to Baltimore and address such a distinguished group of men is an honor I sincerely appreciate.

I have been advised that in choosing my subject I should select one that would be of interest to both the physician and surgeon, and with this end in view I have decided to discuss the treatment of certain types of goitre.

I know that all of you are more or less familiar with diseases of the thyroid, but I trust I will not be tedious or wearisome in stating my personal views, and that, even if I do not advance anything new or original, I can at least refresh your minds or renew your interests in some of the questions as yet unsettled concerning the perversions of the functions of this organ.

The thyroid gland, to my mind, is in many respects the most wonderful organ in the body. Through its internal secretion it influences the physical development of the child and the mental activity of the adult. It regulates the growth of bone, the formation and distribution of fat and the nutrition of the skin, teeth, hair and nails. It plays an important part in menstruation and parturition and has much to do with sexual desire and power. It influences the rate of the heart beat and the character of the peripheral circulation. It presides over the nitrogenous metabolism of the body, and in other and perhaps unsuspected ways plays an important part in the human economy.

If thyroid secretion is excessive, there are symptoms or metabolic riot. Heat production and gaseous interchange are rapid. The body tissues are stimulated to a course of wasting dissipation. There are seen tremors, sweating, tachycardia, muscular weakness, loss of weight and feverish mental activity. The evidence of thyroid excess suggests the entrance of tragedy into the life of its subject.

If thyroid secretion is deficient, the metabolism of the body is depressed and heat production and gaseous interchange are at a low ebb. In the young, growth is lessened and the skeletal system is dwarfed. Connective tissue cells remain myxomatous. The skin is dry and thick and the hair coarse and shows deficient nourishment. The nervous system halts in development and mentality does not rise above the level of the infant. Physically and intellectually, the victim of thyroid poverty is less a man, more a beast.

It is a temptation to speculate as to what the future may have to tell of the thyroid and other ductless glands. Who can say that the dullard, the drone and the vast army of inefficient and dependent may not be close cousins to the cretin? Who can deny that it is possible that thyroxin represents in some measures the baser ore, which worked in the fire of experience is seen and known in the gift of the gods which we call genius? What is there in the history of science to make us doubt that some day we may not find in the internal secretions a physiological explanation for the gall of Napoleon's ambition or the iron of Caesar's hand?

The essential cause of goitre is unknown, although it is thought that eventually it will be proved to be due either to the direct infection of the thyroid with bacteria, or the indirect action on the thyroid of toxins from infection in other regions such as the teeth or tonsils.

Goitre is much more common in women than in men, and this is believed to be due to the fact that the thyroid is a sex gland, and disturbances or diseases of the organs of reproduction are more frequent in the female than in the male.

Goitre is endemic in some sections of the

*Read at meeting of the Medical and Chirurgical Faculty of the State of Maryland held in Baltimore, April 24-26, 1923.

country and this type is believed to be a geologic deficiency disease due to lack of iodine. By the proper administration of iodine to the pregnant woman and to the child during the period of adolescence endemic goitre may be prevented.

The frequency of goitre varies greatly in different sections of the country. The rigid inspection of a large number of men made during the recent war gave interesting and reliable statistics. Figures at the Surgeon-General's Office, based on the result of the examination of the first million men enlisted in the United States Army, showed that simple goitre was present in 14.79% of the recruits from the State of Washington and in only .75% from the State of Virginia.

From the standpoint of the clinician, goitres may be divided in four types, the adolescent, the simple, the toxic-adenoma and the exophthalmic.

Adolescent goitres are seen in young girls from the age of 14 to 20 years. The gland is symmetrically enlarged and increases in size with each menstrual period. The patient is usually nervous and often obsessed with morbid fears, but the symptoms attributed to the goitre are due to hysteria or other causes. Every surgeon has many cases of the adolescent type brought to his office. If he is competent and conscientious, he tells the patient that the condition is not a serious one and advises a life free from excitement or over exertion, an abundance of pure drinking water and perhaps the administration of iodine. Such cases usually get well with or without treatment.

Simple goitres are symmetrical in shape if due to a general parenchymatous hypertrophy, or asymmetrical if due to a cyst or adenoma. They do not produce constitutional disturbances, but simply give rise to deformity of the neck and mechanical symptoms due to pressure. Some of these cases may become toxic or in rare instances undergo malignant degeneration. Operations for simple goitres are indicated to correct deformity, to relieve pressure and to prevent the possibility of the development of toxic symptoms or malignant disease.

Toxic goitres or toxic adenoma develop in patients who usually have had a simple adenomatous goitre for years. These patients, in addition to the symmetrical enlargement of the thyroid, have nervousness, tachycardia, coarse tremors of the fingers and marked loss of weight and strength. Their basal metabolism is perceptibly increased. Unlike the exophthalmic type, they have no marked changes in the eyes. Owing to the chronicity of the disease there is apt to develop secondary degenerative changes in certain vital organs such as the heart, liver and kidneys. Operations for toxic adenoma are urgently indicated. If done early, they are safe, as post-operative reaction is not usually severe and the general condition of the patient is good. If done late, operations are attended by great risk to life, and patients who recover are not usually restored to health, because it is impossible to cure the organic changes that have taken place in the heart, kidneys or other important viscera.

Exophthalmic goitres are due to a hyperplasia of the essential cells of the thyroid and are usually symmetrical in shape. The histological section of an exophthalmic goitre bears the same resemblance to the normal gland that a section of a lactating breast bears to the non-lactating organ. The symptoms of an exophthalmic goitre are not those of local pressure, but of constitutional intoxication from excessive thyroid secretion. The symptom-complex is a familiar one: nervousness, tremors, tachycardia, exophthalmos and feverish mental activity. The basal metabolic rate of these patients is markedly increased. The chief diagnostic differences between exophthalmic goitres and toxic goitres are that the exophthalmic type is usually seen in younger patients, that the symptoms develop more quickly and with greater intensity, and that there is the presence of the characteristic eye changes which are absent in the toxic variety.

There is no difference of opinion in the profession as to the treatment of the first three types of goitre. Adolescent goitres should be treated by medical and hygienic measures. Simple goitres should be operated on if they cause deformity or give rise to pressure symptoms, the patient often being the best judge as to when the disfigurement or discomfort they produce are sufficient to justify an operation. Toxic goitres or toxic adenoma should be removed as soon as discovered, as they do not tend to spontaneous cure or yield to non-operative treatment, and delay leads to incurable structural changes in the heart, kidneys and other vital organs.

When it comes to the treatment of the fourth type, or exophthalmic goitre, however, there is a sharp difference of opinion as to the proper procedure to be followed.

In reviewing the literature of the treatment of hyperthyroidism, one is struck by the fact that honest and experienced men hold divergent views, and that the same man often changes an apparently fixed opinion and attaches little importance to what he at one time considered an essential feature in the treatment of the disease. Until recently it has been impossible to analyze the results reported by different clinicians in series of cases treated by different methods, and to determine what influence was exercised by individual skill and what by the procedure employed. The recent introduction of the metabolic test, however, bids fair to settle many questions under discussion.

It has been demonstrated that the thyroid regulates the general metabolism of the body and that an increase or decrease of thyroid activity is accurately shown by corresponding changes in the patient's metabolic rate. Hence, by determining the degree of metabolism, we now have a scientific means by which we can estimate thyroid activity in an individual case and can tabulate mathematically the effect of the various forms of treatment that are advocated for its abnormalities.

There has not yet been sufficient experimentation or practical experience with basal metabolism to determine its exact clinical value. Like the thermometer it promises to be a most valuable agent, but also like the thermometer its record must be considered together with the patient's clinical symptoms. A patient with typhoid fever who has high temperature will not necessarily die, or one with a low temperature necessarily live. Likewise, a patient with hyperthyroidism may have a high metabolic rate and not be as seriously sick as another with a low rate who has structural changes in the heart, liver and kidneys.

I have found that the basal metabolic rate corresponds pretty closely with the patient's history and symptoms and with the pathological findings of the specimen removed, still I have not come to rely on it as a criterion of operability. This must be decided only after taking every factor into consideration. I have come to rely on basal metabolism, however, first in making a diagnosis in early cases. The onset of hyperthyroidism is usually so gradual that it is difficult to recognize it in its incipiency and here the metabolic rate will clearly differentiate it from hysteria, neurasthenia, tuberculosis and other conditions with which it may be confused. Second, in making a prognosis in late cases, the metabolic rate will determine whether the symptoms are due to the goitre or to degenerative changes in the vital organs and will indicate the danger of the operation and the results to be expected if the patient lives. Third, in assigning a relative value to the different forms of treatment advised for the relief or cure of hyperthyroidism, we are enabled to discard fuss, feathers and foolishness and to concentrate on measures of proved efficiency.

When I began the practice of medicine, it was in an era when electricity was employed in various forms for the treatment of diverse diseases. My father's office was equipped with faradic, galvanic and static machines, and under his supervision I applied the interrupted current to wasted and paralyzed muscles, employed electrolysis after the method of Apostole to absorb fibroid tumors, and sprayed and sparked the heads and backs of neurasthenic patients seated on glass stools. Among other cases was a group of goitre patients who were treated by cataphoresis, the negative pole saturated with tincture of iodine being placed on the enlarged thyroid and the positive pole at the back of the neck. Some of these patients were apparently markedly improved and as a result the number of goitre patients coming for treatment rapidly increased.

I soon grew tired of this routine and uninteresting office work and reading of the results being secured by Kocher of Switzerland, I began to importune my father to treat some of these cases surgically. He finally told me that he had once attempted the operation and that it was the most bloody and barbarous work he had ever done, and he concluded by saying "every man must learn by his own experience, but if there is one thing you may learn from me it is never to operate on a case of goitre." This advice was good for its day and generation. Kocher's mortality in his first seventy operations for simple goitre had been 40% and Chas. H. Mayo's mortality in his first sixteen cases of exophthalmic goitre had been 25%, and it is no wonder that the operation

was then regarded by the majority of surgeons as unwarranted.

Seventeen years ago I did my first thyroidectomy, and I have now operated on more than eight hundred patients for goitre.

In the first hundred operations I had no deaths. This was because I picked my cases. In my second hundred operations I had five deaths. This was because I had become bolder and accepted bad risks. I then became more conservative and adopted the position of Mayo, who at that time held that a thyroidectomy should not be considered a life saving measure and should not be performed on a bad risk, but that such cases should be treated by non-surgical measures and if they failed to improve should be allowed to die a medical death. Under this policy my mortality became satisfactory, but I was rendered unhappy by the necessity of refusing to intervene in certain cases where operation seemed to offer the only chance for life.

Finally, I adopted the teaching of Crile and now operate on every case of hyperthyroidism that is referred to me unless the patient is practically moribund. By adopting many of the measures Crile advises, I have had but three deaths in the last four hundred patients operated on for goitre. I have had my share of bad risks and I have not dodged any of them.

In what I have said I have been personal and reminiscent, but I have run the risk of criticism for a purpose. I wish to present certain views on the treatment of hyperthyroidism which differ from those held by other surgeons of greater reputation and larger experience, and I would not have the courage to do so unless I was able to justify my opinions by my results. It is true that my series of cases is small compared with those of certain large clinics, but it must be remembered that I have personally studied, operated on and cared for each patient, that I have rejoiced in their recoveries or grieved at their deaths, and that the experience gained has made a profound impression on me.

While we do not know much about the etiology of exophthalmic goitre, it is a fact that the condition frequently follows some acute disease and is maintained by a local focus of infection. Before beginning the treatment of any case, the tonsils and teeth should be examined and other possible sources of poison should be determined and, if any diseased condition is discovered, it should be corrected. Recently an early but very acute case of exophthalmic goitre was brought to me. The patient had lost fifty pounds in weight, her pulse varied from 140 to 160, her metabolic rate was plus 87 per cent and she was delirious a greater part of the time. Examination showed abscesses at the roots of four teeth. The teeth were extracted and her symptoms immediately began to improve, without other treatment except rest and proper feeding; she made a rapid recovery, and is now apparently restored to health.

The first and most essential factor in the medical treatment of hyperthyroidism is rest. It should be absolute and complete and must be mental as well as physical. It is useless to try to secure it at home. Patients should be placed in a hospital where they can be under proper control.

Means and Aub studied the effect of rest on a group of cases. These patients had an average metabolism of plus 81 per cent and after from one to three weeks the same group had an average of plus 67 per cent. In a few of the more toxic cases the curve rose in spite of rest. There was no case in the series whose metabolism was brought to normal by rest alone. After about two weeks a level is reached and rest will not cause a further drop.

An ice bag over the heart seems to slow its rate and quiet its tumultuousness, and its application serves to keep patients more quiet in bed as they refrain from turning and twisting for fear of displacing it.

Water should be given in abundance in order to eliminate toxic products from the system by the way of emunctories. Distilled water, while not as palatable, will be found to be more efficient. This is partly due to its greater solvent qualities, but more largely due to the fact that patients think it has special merit and will drink it in larger quantities.

The diet of these patients is important. The machinery of their system is being driven under forced draft, and they need fuel to save the consumption of their own tissues. Food should be given every three hours and in as large quantities as possible without creating digestive disturbances.

The administration of various drugs with a view of lessening metabolism has been advocated. Of these hydrobromate of quinine with

ergotine, glycocholate of soda and pancreatic extract have the greatest number of advocates. Means and Aub have tested the action of hydrobromate of quinine on a group of patients and find that it had no apparent effect on the metabolic rate of the cases. While it is only of historic interest, it may be mentioned that the effect of Beebe's serum on metabolism was also tested and found negative. The administration of digitalis is recommended by Willius, not for its effect on metabolism, but because of its influence on the heart.

The use of X-ray has long been advocated in these cases and more recently the application of radium has been recommended, the theory being that a sclerosis is produced which lessens glandular activity. The relative merits of X-ray and radium have not been determined, but it seems that the choice is largely a question of the experience of the operator and the convenience of the patient. Means and Aub tested the effect of the X-ray on a group of cases. These patients had an average metabolic rate of plus 63 per cent. After one or two treatments at intervals of one month there was a reduction to plus 52 per cent. After four or five treatments there was a reduction to plus 40 per cent, and after two or three years' treatment there was a reduction to plus 13 per cent. The advantages claimed for the X-ray method of treatment are that it avoids an operation and is attended by less danger to life. The disadvantages are the increased length of invalidism, the greater difficulty of operating if surgery is ultimately necessary, the possibility of shrinkage of tissues of the neck, the danger of myxedema and of X-ray burns and the liability of treating colloid and cystic goitres which are not benefited.

The injection of boiling water or a solution of quinine and urea into the body of the thyroid has been advised. The theory on which this practice is based is that the destruction of the glandular cells and the obstruction of blood vessels will cut down the output of thyroid secretion. The method is not without immediate or remote disadvantages and dangers. Some patients are so sick that even this apparently simple procedure will cause an acute and perhaps fatal hyperthyroidism, others will not be benefited and a subsequent surgical operation will be made difficult by the adhesions it has caused, and finally the irritation may result eventually in the development of cancer. Balfour reports 103 cases of malignant disease of the thyroid and it is a significant fact that seven gave history of having beeen treated by the injection method.

If a patient has time and money and is willing to make a pet of a diseased gland and try to humor it back to a normal condition, then palliative measures may be tried, but it is generally conceded at the present time that the safest, surest and quickest way to effect a cure is by surgery. The practice of destroying a portion of a gland in order to lessen its physiological activity is certainly illogical, but it is the best we can do until some chemical antidote for thyroxin is discovered.

The operations done for hyperthyroidism are ligations and partial thyroidectomies. The advocates of ligation state that while the benefits which follow the operation are marked, they are not permanent and that they should only be employed either as a test of a patient's reaction to trauma in cases where there is a doubt of the individual's ability to stand a thyroidectomy, or as a means to get a patient in condition for a more radical operation when it is obvious that at the time a thyroidectomy could not be done without great hazard. Observations in the various surgical clinics of the country show that the number of ligations being done is steadily diminishing and personally I have given them up altogether.

The favorable results attributed to ligations cannot be explained on an anatomical or physiological basis. The theory that ligations act by cutting down the blood supply is refuted by the experience of every operator who knows that tying one or more of the principal arteries does not materially diminish the vascularity of the gland. It is stated that all the blood in the body passess through the thyroid once every hour and ligations actually increase the blood supply by the formation of collateral branches. The theory that ligations interfere with trophic influence is an explanation that has no physiologic parallel in other parts of the body and is an argument about as mysterious and no more logical than those advanced to support Christian Science. The effects of ligations are in my opinion largely due to pyschic influence and to the subsequent treatment of the patient and the same results can be secured by safer and less heroic means. In mild

cases ligations are unnecessary, and in severe cases they are more dangerous than a lobectomy or partial thyroidectomy. The greatest danger of an operation for exophthalmic goitre is acute post-operative hyperthyroidism and this is caused not by the amount of the gland taken out but by the amount of the gland left in, and can be best minimized by the removal of a large portion of the thyroid. In the early days of my work I had some bad results because I was timid and did not remove enough of the gland. With increasing confidence I have taken out more and more tissue and have secured better immediate results and have seen no remote bad consequences. I now do a double partial lobectomy, only leaving a small portion of the gland attached to the posterior capsule on either side. This leaves sufficient thyroid tissue to carry on the normal functions of the body, protects the recurrent laryngeal nerve and other important structures from injury, and gives good cosmetic results, as it does not destroy the symmetry of the neck.

The results of partial thyroidectomy are prompt and permanent. If the operation does not effect a satisfactory cure, it is because either not enough of the gland has been removed or that the operation has been delayed until the patient's symptoms are no longer due to hyperthyroidism, but to organic changes in the vital organs as well.

I do not wish it to be inferred that a radical operation should be done for a bad toxic or exophthalmic goitre without careful preliminary study and often prolonged treatment of each individual case. The patient should be put to bed, given absolute physical and mental rest, an ice-bag applied to the chest, and water and food properly regulated. The fluctuations of the disease should be carefully watched and the operation fixed for the most propitious time. Every effort should be made to inspire the patient with confidence and to relieve apprehension and fears.

A few patients will not bear transportation and should be operated on in their rooms without moving them from bed. Some do best under local anesthesia, others require light nitrous oxide oxygen in addition. Often after the removal of the desired amount of glandular tissue it is wise to pack the wound and delay closure for two or three days. It is always well to provide for liberal drainage. After the operation water should be given by rectum or subcutaneously, morphia without atropia administered to relieve pain and quiet restlessness, and cold sponges or ice packs employed to combat fever if elevation of temperature occurs.

THE TREATMENT OF LOBAR PNEUMONIA DUE TO PNEUMOCOCCUS INFECTION.*

By LEWELLYS F. BARKER, M. D., Baltimore, Md.

Lobar pneumonia due to pneumococcus infection has well been designated the "captain of the men of death." The appalling mortality from this disease and the fact that the majority of the patients suffering from it are treated by general practitioners rather than in hospitals make a discussion of the treatment of the malady worth while in a meeting composed of men engaged in general practice.

The incidence of and mortality from pneumonia vary greatly at different periods of the year. As many people die of pneumonia during the first four months of each year as in the whole of the rest of the year. Indeed it is probable that the total mortality from January to April exceeds that from May to December.

A comparatively benign malady in early life, the mortality rate in lobar pneumonia increases with every decade, until between the ages of sixty and seventy probably three-quarters of all who are affected die of the disease, though the average mortality for all ages may not exceed perhaps twenty per cent.

Systematic Methods of Treating Lobar Pneumonia Now Largely Discarded.

No chapter in the history of medicine is perhaps more interesting than that which deals with attempts at systematic treatment of lobar pneumonia. From the earliest times on, various remedial agents have been successively lauded for their curative power in this disease. But each of these methods of systematic therapy has in turn been abandoned. One master of medicine after another has prided himself in introducing a cure for lobar pneumonia. But despite every effort the average mortality has through the centuries remained nearly the same.

Let me remind you of some of these syste-

*Read at the Seaboard Medical Society, Newbern, North Carolina, December 6, 1922.

matic methods of treating the disease and their failures; they will serve as notable examples of the excessive therapeutic credulity of many of the great leaders in our profession. Thus, Brown was a believer in the efficacy of "excitants" to increase the "sunken irritability" in lobar pneumonia. He gave wine, brandy and opium with this purpose in view, and a similar theory was responsible for the massive doses of alcohol prescribed by Todd in England and by Dehier in France. An opposite theory lay at the basis of the large doses of tartar emetic ("contra-stimulation" of Rasori), a therapy much employed by no less a man than Laënnec.

Local and general bleeding also had great vogue for a long period for the combating of the inflammation of the lungs, a therapy strongly advocated by Broussais and later by Bouillaud, both French clinicians of eminence in their time. It is recorded that Broussais in his own last illness ordered six venesections and the application of over sixty leeches to himself. In the year 1819, in his division of the Val de Grace Hospital, more than one hundred thousand leeches were used. So popular became this method of treatment that in France in the year 1824 as many as three hundred thousand leeches were applied, and in the year 1827 some thirty-three million leeches were made use of. Bouillaud pushed bleeding to an extreme, in many cases causing syncope. His idea was to bleed the patient until he was white (*saigner a blanc*)! So universal had the custom of bleeding in pneumonia become that in 1849 a physician was put under arrest for not bleeding a patient who suffered from the disease.

A little later, the treatment of pneumonia by means of large doses of digitalis was recommended by Hirtz of Nancy and by Petrescu of Bucarest. Even Traube had confidence in the combination of bleeding and digitalis therapy.

Still another method of systematic therapy was camphor in large doses recommended by Seiffert of New York and by Oppenheim and Loeper in Europe.

Notwithstanding the advocacy of each of these methods by men of real eminence they have all fallen into disfavor, and the remedies that were vaunted for universal application are now restricted to employment only on special indication.

The Era of Therapeutic Nilhilism.

It is but little wonder that therapeutic scepticism greatly increased as clinicians gradually became aware of these successive failures in those systematic methods of treatment of lobar pneumonia to which I have referred. It was Skoda, especially, who emphasized the fact that patients suffering from lobar pneumonia recover just as often when nothing is done except to keep the patient comfortable in bed on a simple diet as when heroic methods of therapy are employed. It was only through experience that physicians learned how well patients suffering from pneumonia can do when left to nature's method of cure. During the years 1842 to 1846 in the Weiden District Hospital in Vienna, three hundred and eighty persons were treated for primary pneumonia, eighty-five of them by venesection, one hundred and six by large doses of tartar emetic, and one hundred and eighty-nine simply by dietetic measures. The results reported were as follows:

Cured:	
With venesection	68
With tartar emetic	84
With dietetic methods	175
Died:	
With venesection	17
With tartar emetic	22
With dietetic methods	14
Mortality Rate:	
With venesection	20.4%
With tartar emetic	20.7%
With simple dietetic methods	7.4%

This was a remarkable showing and led many conservative clinicians to follow Skoda's example of utilizing only expectant and symptomatic methods of treatment. His maxim was, "Observe the course of a disease when it is left to itself, uninfluenced by drugs."

Criteria for Judging of the Efficacy of Therapy in Lobar Pneumonia.

We have seen how, systematic therapy proving a failure, clinicians came gradually to rely upon expectant and symptomatic treatment only. They were content to relieve symptoms as they appeared and to use special methods of treatment only when they seemed to be indicated by the appearance of special symptoms or signs.

In recent years attempts at specific therapy (as contrasted with expectant symptomatic therapy) have been revived, particularly since our knowledge of the infectious processes has

grown, and methods of vaccine therapy, immunotherapy and chemotherapy have developed. In order, however, to judge of the efficacy of any specific method of therapy, careful clinicians are no longer content with the mere impression that a given therapy exerts a favorable effect. They demand the application of objective methods of measurement before passing judgment upon efficacy on the one hand or of worthlessness on the other.

In general, it is now recognized that the course of a lobar pneumonia depends partly upon the number and virulence of the invading microörganisms (pneumococci) and partly upon the powers of resistance and the mode of reaction of the sick person. As every general practitioner is aware, pneumonia is a more fatal disease in some epidemics than in others, and even in one and the same epidemic the virulence of the micrococcus lanceolatus may vary considerably. Attention must be paid, therefore, to both epidemiological and individual factors when judging of the efficacy of any form of specific therapy. Accordingly, the statistical results must include (1) a large number of cases (on account of individual differences) and (2) cases from more than one period of prevalence (on account of differences in epidemiological factors). It is desirable also that the statistics include (3) cases occurring in different localities. Finally, it is desirable (4) to group the cases according to the type of *pneumococcus* that is causal.

One of the best methods of judging the efficacy of a therapy is to compare in the same epidemic the results obtained in patients under treatment with those obtained in control cases not subjected to the treatment. The epidemiological factor is then the same in the treated and in the untreated cases. As Cahn-Bronner has emphasized, statistics that deal with comtemporaneous cases where there are both control cases and treated cases of a similar sort, and where the material is abundant and is distributed over several years, afford the requirements for an objective judgment of the influence of a given therapy. In other words, the most careful clinical observation of single cases thus studied will yield information not derivable from the haphazard study of statistics that have not been similarly controlled.

When the treatment of the disease is begun late, the most important criterion of its efficacy is the mortality rate. When the treatment on the other hand has been begun early, one can use as a criterion not only the mortality rate but also the duration of the fever after the initial chill or, in its absence, after the first rise in temperature.

Discussion of Current Conceptions of Pneumonia Therapy.

In our time, following the lead of clinicians like Billings, Fitz, Janeway, Osler, and Shattuck in this country, most practitioners in the treatment of lobar pneumonia have been content with the institution of a simple dietetic-hygienic regime, with expectant-symptomatic therapy, and with the treatment of complications. They soon became aware that patients suffering from milder forms of lobar pneumonia get well spontaneously, and that no violent therapy of any sort is needed, or is beneficial if applied. In the severer forms of pneumonia they have learned that great care in the general management of the case (especially good nursing, close attention to the relief of troublesome symptoms, and support of a failing circulation) will often turn the balance in favor of the patient and save his life. In the worst forms of pneumonia, especially the asthenic types of the aged, the therapist has been practically helpless and has been compelled virtually to throw up his hands!

Recently, in addition to the simpler forms of therapy just mentioned, new hope for specific forms of therapy has been aroused. Before discussing the newer causal therapy, however, it will be convenient to refer in more detail to the main points of practical importance in functional, regulatory and symptomatic therapy.

Functional Regulatory and Symptomatic Treatment of Pneumonia.

Symptomatic therapy neither attempts to intervene in the disease process as such nor to attack its cause, but does make the effort to relieve single troublesome symptoms. *Functional therapy* tries to restore some normal function that through the disease has become disturbed or abolished. And *regulatory* therapy attempts to aid the body in reacting against the disease process or the disease cause. These forms of therapy, symptomatic, functional and regulatory, are the forms that we have relied upon most since the abandonment of the old systematic methods of treating

pneumonia and before the advent, very recently, of new forms of etiotropic therapy.

Lobar pneumonia usually begins abruptly with a chill, a stitch in the side, and a rapid rise of temperature; these are the symptoms that bring the practitioner to the patient's bedside. It is only rarely that these symptoms are preceded by prodromata such as headache, pains in the limbs, anorexia, or signs of bronchitis. The actual onset is usually so characteristic that the experienced practitioner, when he hears the history of chill, of pain in the side, and of fever, when he observes an increased respiratory rate, an accelerated pulse rate, and delayed expansion on one side of the chest with perhaps a little suppression of the breath sounds there or a few fine crepitant rales, knows that he is dealing with the onset of a lobar pneumonia. He will, if there be an excruciating pain in the side, relieve it promptly by a small dose of morphine and will then immediately set about the organization of the sick room, and the nursing, and will arrange for the general management of the case.

General Hygienic and Dietetic Regime.

The patient will be kept quietly in *bed*, a place in most cases already sought before the advent of the physician. He should be dressed in a light night-gown, which opens at the back rather than in front, or which opens both in front and behind. The bed and mattress should be comfortable and the covering warm but light. A blanket and a rubber sheet should be placed under the bottom white sheet to ensure warmth and dryness. A hot-water bag should be placed at the patient's feet, the hot water being renewed at frequent intervals.

The *room* should be large, exposed to sunlight and well ventilated. Most rooms can be sufficiently well ventilated by means of windows. If a sleeping porch be available, it may be employed. For a period, at the Johns Hopkins Hospital, we placed all pneumonia patients out-of doors, even in the winter time, and I must admit that they did very well. I see no reason, however, for insistence upon out-of-door treatment provided an in-door room is well ventilated. Nursing and medical attention can in-doors be given so much more easily than outside that the advantages seem to me to be on the side of in-door rather than of out-door treatment.

The *surroundings* of the patient should be quiet; he should be left very largely to the ministrations of the nurses and the physicians. He should lie in an atmosphere of reassurance. Members of the family or friends who would disturb such an atmosphere should not be admitted. Family visits should be limited to one or two perons at a time and the stay of each should be brief.

In the treatment of pneumonia, *good nursing* is one of the most important features. The chances of the patient for recovery are distinctly increased if it is possible for him to have two well trained nurses in attendance, one for the night and one for the day. Such ideal nursing care is, however, possible only for the well-to-do, and circumstances must determine what approximation to this ideal is feasible in a given case. The nurses will keep the patient comfortable in bed, and will prevent unnecessary exertion. They will control the ventilation of the room and the number and character of visitors admitted. They will keep the clinical charts for the physicians, on which the temperature, pulse, respiration, fluid intake, fluid output, bowel movements, and prominent symptoms are registered. They will see to it that food and water are administered at regular intervals, and they will be always at hand to facilitate the physical examinations that are made by the physician and to carry out faithfully the therapeutic regimen he prescribes. Members of the family or friends, with the best will in the world, cannot do for a patient what a trained nurse can do, and the wise physician will see to it that, whenever practicable, the patient's chances for recovery are favored by the institution of skilful nursing from the very start.

The *diet* should consist of liquid food, chiefly of milk, or of milk with a little cereal added to it, though at intervals chicken broth or meat or vegetable broths may be added for variety. In the milder cases eggs, either soft boiled or raw, or in the form of egg albumin, may be administered. In addition, the patient should drink freely of water or of lemonade, and if desired some cane sugar may be added to the lemonade and some milk sugar to the milk. In severe cases with delirium, insufficient food and liquid may be taken by the mouth, in which case it may be necessary to administer it per rectum or even subcutaneously. Vomiting also may interfere with oral administration of food and liquid, in which event sub-

cutaneous infusions of salt solution containing glucose may be administered, or one may give a 0.047% solution of glucose per rectum by the Murphy-drip (fluid warmed to body temperature; one liter introduced by the drop method twice a day).

That due attention to *evacuation of the bowels* should be given goes without saying. If the patient is seen at the start he may be given two grains of calomel at night followed by a saline the next morning. A daily movement of the bowels should be secured by means of salines, of enemata, or by the use of a little castor oil. Drastic purgatives should be avoided. In toxic cases diarrhea is sometimes a troublesome symptom and may require checking by means of a little Dover's powder or a little paregoric after each movement.

Hydrotherapy, internal and external, is an important item in the general regime, since it goes far toward combating the effects of the toxemia and in preventing circulatory failure. In mild cases a tepid sponge once or twice daily, disturbing the patient as little as possible, contributes to the patient's well being and somewhat lessens the fever. If the temperature be very high, a cold sponge may be given every three hours or the patient may be wrapped in wet cold compresses (wrung out of water at a temperature of 78° to 60° Fahrenheit) every hour. Some physicians immerse patients showing hyperpyrexia in a cold tub just as in the treatment of typhoid fever by the Brand method. In my experience, however, cold sponging or the application of wet compresses yields fully as satisfactory results and is less disturbing to the patient and makes smaller demands upon the nursing force and attendants; moreover the psyche of the patient is less agitated. In applying cold compresses it is best to wring the compresses out of cold normal salt solution rather than out of plain water, to avoid maceration of the skin with predisposition to local skin infections.

The *mouth* should be kept clean and moist by the nurse. In mild cases the patient may rinse it at frequent intervals with a suitable mouth wash and may even use the tooth-brush morning and evening. In severe cases the care of the mouth must be left entirely to the nurse who will clean it with a swab soaked in mouth-wash.

The *nose*, too, should be kept clean and if possible open. If there be swelling of the turbinates and obstructed nasal breathing temporary relief may be given from time to time by snuffing up a menthol-eucalyptol ointment.

Many physicians feel that from the beginning it is desirable to administer regularly some form of drug, partly in order that the patient and his friends may feel that something in a pharmacotherapeutic way is being done, partly because they believe that the administration of a mild diuretic like potassium citrate (one gram four times a day) or a mild diffusible stimulant like ammonium acetate (one gram three or four times per day) will contribute something to the welfare of the patient. I can see no especial objection to the administration of either of the remedies mentioned though I am doubtful whether they are of any real value aside from the psychotherapeutic effect that they may produce. I should warn, however, against the routine administration of any drug that can be disturbing to the digestion of the patient or that causes discomfort in any form. The expectorant mixtures are particularly to be condemned; they do no good, most of them are disagreeable to take, and many of them disturb digestion by exciting nausea or causing meteorism.

The Relief of Single Symptoms.

The more experience one has in the treatment of pneumonia the greater his recognition of the salutary effects on the patient of relief of disturbing symptoms, especially pain, cough, dyspnoea, insomnia, and abdominal distention.

Cough.—It is especially the dry cough at the onset of the disease and during the period of consolidation that demands symptomatic relief. It is very fatiguing to the patient; it increases the pain in the side during the day and, if left uncontrolled at night, keeps the patient awake. This dry and, for the most part, non-productive, cough can be sufficiently controlled during the day by a twelfth of a grain of heroin and a quarter of a grain of codein given in tablet form every two, three or four hours as required. At night it is well to administer, hypodermically, a small dose of morphine at 9:00 P. M. and to leave an order for its repetition during the night if the cough is disturbing. It is surprising what small amounts of morphine will suffice; for some patients 1/16, 1/12 or 1/8 of a grain are adequate. It does not seem to me right to permit patients to be harassed by racking cough

during an acute pneumonia when this cough can be fairly well controlled by the methods described and without harm to the patients.

Pain.—The pain in pneumonia, usually described as a "stitch in the side," is due to a dry pleurisy where the lobar pneumonic process reaches the pleural surface. It is often so violent at onset as to require a small hypodermic of morphine for its relief. When less severe, the application of a flat ice-bag or of salt solution compresses may sufficiently ameliorate. The older clinicians were wont to apply wet or dry cups, mustard plasters, blisters or poultices for the relief of this pain. Though these measures in many instances ease the pain, they are objectionable since they irritate or macerate the skin, favor local skin infections and interfere seriously with physical examinations of the chest. Instead of applying poultices of flaxseed or of kaolin one does better to be content with a flat ice-bag or with salt solution compresses at the beginning and to follow these later with a simple "pneumonia jacket" (to open both in front and behind) made of cotton batting stitched between layers of cheese-cloth.

Dyspnoea.—The shortness of breath and the accelerated respiratory rate at onset are usually relieved when the pain of the stitch in the side is assuaged and after mild hydrotherapeutic measures have been instituted. If, however, great oppression be felt owing to massive pulmonary involvement and especially if the patient be full blooded, a venesection or the withdrawal of from 300 to 500 cc. of blood by means of a syringe from a vein at the bend of the elbow will often give marked relief. In the dyspnoea of the later stages, especially when associated with anoxemia, inhalations of oxygen may be really valuable. The ordinary methods of administering oxygen are, however, very faulty. When oxygen is needed, it is best to administer it by the Haldane method, which permits a certain intake of 2.5 litres of oxygen per minute (Meakins), or by means of Meltzer's hollow tongue depressor. In hospital practice where a respiratory cabinet is available, the patient may be placed in the cabinet filled with oxygen (Means).

Insomnia.—This is often a distressing symptom and is associated with restlessness that adds greatly to the fatigue of the patient. As has been pointed out it often depends upon the dry racking cough and small doses of morphine, which lessen the cough and relieve the pain, also give sleep. In the absence of cough and pain an adalin-luminal tablet, a small dose of barbital or of one of the barbital derivatives, or a dram of the mistura chloralis et potasii bromidi composita (N. F.) may contribute to a restful night.

Abdominal Distention.—Distention of the abdomen is a common symptom in lobar pneumonia and is often an evidence of a severe toxemia causing atony or paralysis of the wall of the intestines. Much can be done to prevent its development by keeping the mouth clean, by careful attention to the diet, by regular evacuation of the bowels, by forcing water, and by external hydrotherapy. Tympanites often develops, however, despite these measures and demands symptomatic treatment. Turpentine stupes to the abdomen, turpentine enemata, or the occasional passage of a rectal tube, permitting the gas to escape, may do much to relieve it. In severe meteorism I have several times seen much benefit follow the hypodermic administration of pituitrin in full doses (1 cc. ampoule). Occasionally 1 cc. of pituitrin will cause cramping of the intestine and pain in which event ½ cc. may be given and repeated after a few hours. Tympanites should not be neglected for, pressing the diaphragm up, it further interferes with a respiration that is already impaired, increases the dyspnoea and anoxemia, and throws a greater burden upon the right heart.

Treatment of the Complications of Lobar Pneumonia.

Space will not permit of a full discussion of all of the possible complications of lobar pneumonia and I shall refer only to those that are more common; especially to toxaemia, circulatory failure, and empyema.

Severe Toxemia.—As I have said, the physician does much to combat the toxemia by instituting a careful general dietetic-hygienic regime, and, especially, by internal and external hydrotherapy (which promotes elimination through the skin and kidneys) and by saline laxatives or enemata.

Severe toxic symptoms can sometimes be ameliorated by venesection. When patients do not swallow sufficient fluid, the toxaemia is likely to be more marked: salt solution should then be injected subcutaneously (300 cc. to 500 cc.) and salt and glucose solutions may be given per rectum by the Murphy-drip method.

Circulatory Failure.—The most dreaded

complication of pneumonia and that responsible for death in perhaps the majority of cases is circulatory failure, dependent either upon weakness of the myocardium or, more often perhaps, upon loss of tone of the peripheral arterioles (vasomotor paralysis). It is for this reason that cardiotonic therapy and measures designed to maintain the tone of the peripheral arterioles have long been popular in the therapy of pneumonia. Many clinicians use digitalis from the beginning, in the hope of maintaining the tonicity and contractility of the cardiac muscle, especially that of the right ventricle. There would seem to be no objection to this in patients who before their attack of pneumonia have suffered from cardiac or renal disease, though in my opinion it is not desirable as a routine measure in all cases. The closest watch should be kept, however, upon the behavior of the heart, and when signs indicating overstrain of the right heart develop, therapy should be prompt and vigorous. Digitalin or strophanthin may be given by intramuscular injection and, if there be marked cyanosis or signs of a developing pulmonary oedema, venesection should not be delayed. In incipient pulmonary oedema, in addition to the measures mentioned, a subcutaneous injection of morphine with atropin, or of atropin alone, may be helpful.

A change in the quality of the pulse may be an important indication for therapy. As soon as the pulse tends to become faster, to be smaller in volume, and softer, the administration of caffein or of camphor should be begun. One may give 0.1 of caffein sodium benzoate from three to five times per day by mouth, or powdered camphor (0.2) with benzoic acid (0.2) and a little milk-sugar three times per day by mouth. If the pulse failure develop more rapidly, caffein sodium benzoate may be given subcutaneously (in 15% aqueous solution), or camphor may be given subcutaneously in doses of 2 to 5 cc. of camphorated oil (20% solution.) Strong black coffee is an excellent stimulant for the heart, given as hot as the patient can drink it. Alcohol is indicated if the patient has been accustomed to taking alcohol regularly. Pneumonia in alcoholics is particularly fatal and delirium tremens (an abstinence phenomenon) is likely to develop when an old toper is suddenly deprived of his regular alcoholic intake.

In vasomotor paralysis, in addition to the cardiotonic therapy just mentioned, an effort may be made to restore the peripheral arterial tone by the administration of pituitrin, of epinephrin, or of ergotol subcutaneously, and possibly something may be done to stimulate the vaso-constrictor center in the medulla by the hypodermic administration of strychnine, (1/20 grain) every two or three hours. The latter drug will also be indicated if there should be a tendency to respiratory failure.

Empyema.—Every lobar pneumonia is complicated by a dry pleurisy, which is responsible for the stitch in the side at the onset. Pleurisy with serous effusion and pleurisy with purulent effusion (empyema) are more important complications. They are most often met with toward the end of the pneumonic process, or after the crisis has occurred. Regular physical examinations should be made, especially in cases in which the fever continues or in which there is a recrudescence of the fever after the crisis. An exploratory needle should be introduced when the physical signs are at all suspicious. If pus be found, the pleural cavity should be freely drained.

Jaundice.—In severe pneumonias, jaundice may appear as a complication, due either to a catarrhal cholangitis or to toxic injury to the liver itself. The complication is best ignored unless the jaundice persists after the pneumonia has run its course.

Meningitis.—Suppurative meningitis due to the pneumococcus, occurring as a complication of pneumonia, is likely to be fatal, though spinal drainage, and possibly the introduction of anti-pneumococcus serum into the subarachnoid space may occasionally be life-saving. Symptoms of meningitis, however, do not necessarily indicate a suppurative process. Meningitis serosa, or meningismus, is not uncommon as a complication of pneumonia, and the symptoms are often relieved by lumbar puncture. Many cases presenting meningismus at one time or another during the course of a pneumonia recover.

Collapse at the Crisis.—If, at the crisis, symptoms of collapse appear, with rapid feeble pulse, falling blood pressure and profuse perspiration, the treatment is the same as that suggested for circulatory failure due to vasomotor paralysis (see above). In addition, a hypodermic of atropin may be administered.

Profound Asthenia.—Asthenic pneumonia is common in the aged, and in other persons in whom resistance to infections is lowered.

The reactive powers of the organism seem to be in abeyance, for the patients may show little or no fever, only a slight cough, a little dyspnoea, few physical signs in the lungs, though they have a rapid feeble pulse, and manifest profound general weakness. Sometimes cases of asthenic pneumonia occur in small epidemics, probably owing to a peculiar virulence of the invading microörganism. The different forms of asthenic pneumonia are exceedingly dangerous; when they are met with, the prognosis should be very guarded. Cardiotonic and vasotonie therapy should be begun early. Despite every effort to increase the reactive powers of the organism, the disease is only too prone, in such cases, to terminate fatally.

Management of Convalescence From Lobar Pneumonia.

After the crisis, convalescence is, in favorable cases, rapid, and patients if not closely watched may increase their diet too rapidly or attempt to return to exertion too early. They should be kept in bed for at least a week after the temperature is normal, the diet should be only gradually increased, and careful attention should be paid to all the details of hygiene until strength has been fully restored. When allowed to leave the bed, a patient should sit up only one hour or less the first day, two hours the second day, and three hours the third day, after which, if he has grown stronger, he may be allowed to walk about a little. Should the appetite be poor some bitter tonic (nux vomica and gentian) may be given. The patient should be urged to protect himself carefully for at least a month after the illness. When possible he should have a change of air (at the sea or in the hills) until recovery has become complete. Such measures are especially important in patients who have had complications like empyema. Convalescents should be warned that those who have had lobar pneumonia once are more prone than other people to pneumonic infections; every precaution should therefore be taken to build up the general health and to avoid undue exposure to cold or excessive fatigue, especially during the winter months.

Modern Attempts at Etiotropic Therapy.

The mortality of lobar pneumonia, even under the most appropriate functional, regulatory and symptomatic therapy, is still very large, and physicians are, therfore, naturally anxious for the discovery of some form of therapy that will lessen this mortality. Especially since such brilliant results in the treatment of certain infections by vaccine therapy, by serotherapy and by chemotherapy have been achieved, there has been much experimentation in the direction of the discovery of a specific therapy for lobar pneumonia due to the pneumococcus. To the present status of this phase of our subject, we may now conveniently turn.

Vaccine Therapy.—Rosenow (1918) of the Mayo Clinic has recommended the use of partially autolysed pneumococci in the treatment of lobar pneumonia, advising the administration of 1.0 cc. daily until the temperature reaches normal. He reports a mortality of only 7% in 200 cases treated. It is too soon as yet to pass judgment upon this form of therapy but it is perhaps worthy of a thorough trial in some of our organized clinics. I doubt if it is desirable for the general practitioner to resort to it until larger experience has been gained.

There is some evidence that the injection of pneumococcus vaccine (polyvalent) may be useful as a prophylactic measure at times when pneumonia is prevalent, though it is not certain as yet that such vaccination is as efficacious as the vaccination against typhoid. The report of Cecil and Austin (1918) in 12,519 instances is encouraging, as are the reports of Burnside (at Camp Dix) and of Duckwall (at Camp Taylor). It seems probable, however, that any immunity derivable from the injection of pneumococcus vaccine is of relatively brief duration.

Serotherapy.—Thanks to the researches of Rufus Cole and his associates at the Hospital of the Rockefeller Institute in New York, and to those of investigators at the Pasteur Institute in Paris, we have been given new hope for an efficacious treatment of pneumonia at least in one or two of its forms. The studies of Dochez and Gillespie (1913) and those of Lister in South Africa in the same year proved the existence of different types of pneumococci. These investigators isolated three different types (type I, type II and type III), each of which on animal inoculation gives rise to specific agglutinins and to specific precipitins. Beside these three groups, there are other forms of pneumococci (not all alike), which differ from the first three types in their morphology, in their solubility in bile, and in

the immune bodies to which they give rise. Cole at once undertook the experimental production of anti-sera for the different types of pneumococci. Thus far a specific serum of high titer has been successfully produced for type I; another serum, less efficacious, has been made for type II; attempts to produce a serum beneficial in infections from type III have been wholly unsuccessful. Infections due to penumococci not belonging to types I, II and III, are usually benign infections ending in recovery without specific treatment.

Obviously, if sera antagonistic to the single types are to be employed therapeutically, it is desirable to determine as soon as possible after infection the particular type of pneumococcus that is its cause. Various methods of determining the type have been worked out, among them a method of mouse inoculation by Blake (1917), a method by means of a special culture medium by Avery (1918), and a coagulation method by Krumwiede and Valentine, (1918). Arrangements are now made in private bacteriological laboratories and in public health laboratories for typing pneumococci speedily, so that it is possible in most cases to receive a report within twenty-four hours after the collection of the sputum or of material obtained by lung puncture.

On account of the dangers of anaphylaxis, certain precautions should be observed before the administration of a specific serum. A history of hay fever, of bronchial asthma or of the previous use of anti-sera should make one particularly cautious. Even though the history be unsuspicious, it is probably wise to give first an intracutaneous injection of 0.02 cc. of horse serum diluted with ten times its volume of normal salt solution, and to compare the effect of this injection with that of the same amount of normal salt solution used as a control. If the patient be sensitized, a definite wheal will develop at the site of the injection within an hour. Whether the patient is thus found to be sensitive or not, if one desires to be entirely safe he may give a desensitizing dose of 0.5 to 1.0 cc. horse serum subcutaneously an hour or two before injecting the antipneumoccccus serum intravenously.

The dosage of Cole's serum for type I is 100 cc. diluted with an equal volume, or more, of normal salt solution prepared from freshly distilled water. It is injected intravenously and at the body temperature very slowly over twenty to thirty minutes. The injection is stopped immediately if cyanosis, dyspnoea or marked pallor should appear. Any evidence of anaphylaxis is an indication for the prompt injection of 10 minims of a 1 to 1,000 solution of epinephrin and 1/100 or 1/120 of a grain of atropin sulphate. Indeed, these remedies should be made ready for injection (in a syringe) before the intravenous therapy is undertaken.

The intravenous injection of the antipneumococcus serum is often followed by a rather pronounced reaction (fever, chill, cyanosis) in the course of from thirty to sixty minutes, but this reaction is usually followed within a couple of hours by a marked fall in the temperature and by sweating. Should the fever return within four to eight hours, a second intravenous injection of 100 cc. is given, and this dose may be repeated every eight hours until the temperature remains normal (Cole). In most cases three doses of the serum have been found sufficient.

In about half the cases that recover, the symptoms of a mild serum sickness appear in a week or ten days after injection, manifested by hives, itching, and joint pains. In a few cases the serum sickness is severe and requires epinephrin injections and local soothing applications for its control.

That the serum prepared to combat infections with type I has some efficacy seems to me to be clearly shown by the statistical results, though experience is as yet too limited to permit us to gauge very accurately the reduction in mortality that can be gained. Dr. E. A. Locke of Boston tells me that in a series observed by him the mortality was not less than that of controls that did not receive the serum. It goes without saying that the serum should be administered as early as possible after the initial chill and as soon as the typing has been completed.

What has been said above refers particularly to experiences with a high titer serum against type I pneumococcus. Favorable results have been reported by Cecil, (1918) from the use of a specific serum against type II, and Spooner, (1920), corroborates Cecil's view. Workers at the Rockefeller Institute are, however, doubtful of the possession, as yet, of a serum against type II of sufficient potency, and all agree that sera effective against type III still remain to be produced.

Truche, of the Pasteur Institute, (1919), has made four different sera corresponding to

the four different races of pneumococci. He recommends subcutaneous injections in doses of 80 to 100 cc. the first day and in doses of 20 to 40 cc. on following days, or better still intravenous injections (diluting 20 cc. of serum in 180 cc. of normal salt solution at the body temperature). Truche also uses the sera against pneumococcus infections of the pleura, of the meninges and of the endocardium. He advises intrapleural injection in doses of 60 cc. the first day and of 20 cc. on each following day after evacuation of an effusion. In meningitis he gives 40 cc. into the subarachnoid space as well as 20 cc. intravenously. In endocarditis he gives 20 cc. intravenously.

In 1921, Stengel of Philadelphia made a report on the use of serum and blood of convalescent patients in the treatment of lobar pneumonia. He advises collecting the serum from patients shortly after the crisis, keeping it on ice in a sterile container, and using it not later than from ten to fourteen days after collection. He gives from 30 to 70 cc. of this convalescent serum at a dose.

Polyvalent sera against pneumococcus infections have been prepared by Kyes and others. In one of the army hospitals, therapeutic experiments were made with Kyes' serum, and it appeared to exert at least some favorable effect.

The use of the Huntoon preparations has been advocated by some clinicians. The reactions after injection are often violent, sometimes dangerous, as in other forms of "foreign protein therapy." At present the consensus of opinion seems to be that the high titer serum produced against type I pneumococcus at the Rockefeller Institute is definitely of some value in the treatment of lobar pneumonia, due to infection with this type. Farther than this no definite statement dare yet be made.

Chemotherapy of Lobar Pneumonia.—For more than fifty years quinine has been used in one way or another in the treatment of lobar pneumonia, first as a tonic, later as an antipyretic, and still later as a specific remedial agent. Some very distinguished clinicians have been convinced of the advantages of quinine therapy. DaCosta around 1880 is said to have strongly advocated full doses of quinine shortly after the chill (S. Solis Cohen). He asserted that it will often arrest the development of an acute lobar pneumonia:—"It is difficult to prove this fact because one has no means of knowing that what is absent was on the way. Yet it is true. The fact that pneumonia sometimes aborts spontaneously or runs a very short course does not negative this view. The real difficulty is that one rarely sees his patients soon enough." Since 1904 Solis Cohen has systematically used large doses of the double hydrochlorid of quinine and urea subcutaneously, intramuscularly and intravenously, in the treatment of lobar pneumonia (see his report, 1913).

A distinguished Edinburgh physician, the late Dr. George A. Gibson, believed that he had saved lives, even after patients had entered coma, by injections of quinine.

Aufrecht introduced the parenteral method of administering quinine in pneumonia and has systematically used it subcutaneously in the treatment of the disease since 1895. His advice was to give quinine subcutaneously when the disease is at its height, is taking a severe course and is becoming threatening, especially when the pulse is small, soft and frequent, or when slight deliria become noticeable. He thought that the beneficial results are less in its effects upon the temperature than in the specific influence that it exerts upon the causal microorganism or its products. It was rare to see a lessening of the fever; much oftener he saw a "favorable influence upon the total course of the disease." This method of Aufrecht's has been designated the "specific late treatment of pneumonia with subcutaneous injections of quinine." The "early treatment of pneumonia with intramuscular injections of quinine" was begun by A. Cahn and has recently been given a very careful trial by C. E. Cahn-Bronner, who believes that the course of pneumonia can be definitely shortened by early intramuscular injections of quinine.

Meanwhile, on account of the earlier clinical studies with quinine and on account of the influence of quinine and quinine derivatives on trypanosomes, Morgenroth and Levy, (1911) undertook the chemotherapy of bacterial infections and recommended the use of an especial quinine derivative, namely ethyl-hydrokuprein, or optochin, as a most suitable chemical for the treatment of pneumococcus inflammations in man. Since 1911 many studies have been made both of the optochin treatment of pneumonia and of the quinine treatment of pneumonia.

Optochin kills pneumococci in vitro. If it be injected into the peritoneal cavity of mice

thirty minutes before inoculation with what is ordinarily a fatal dose it will save the lives of a large percentage of them. Morgenroth and Levy undertook experiments to see whether or not optochin is useful in human pneumococcus infections and whether doses sufficient to be effective against the infection can be used without injury to the organism. Their results have been controlled by a number of clinicians in Europe and in America. Most of the clinical reports are against the use of optochin because of the danger to the eyes. Its use was forbidden in military service in Germany during the great war.

In this country a critical study of the matter was made by Moore and Chesney, (1918); they too felt that they dare not recommend the use of optochin for the routine treatment of lobar pneumonia. The whole matter has recently been reviewed by Cahn-Bronner in the *Ergebnisse der innere Medizin*, (1922).

It would appear to be true that, in a certain proportion of cases, lobar pneumonia may be shortened or even aborted by the use of optochin, that the general state of the patient can often be improved and that the mortality rate can be somewhat diminished. Though the results have been, on the whole, disappointing, they are still noteworthy. The best method of administering optochin is that of Mendel who gives optochin base in five doses of 0.3 grams or in six doses of 0.25 grams per day; the total daily dose not exceeding 1.5 grams. Mendel thinks it important also that optochin be given along with a pure milk diet, which is continued through both the day and the night. If optochin be given in this way there seems to be very little danger; a fairly steady absorption is arranged for. It is interesting that optochin has a specific effect upon pneumococci but no effect upon streptococci, whereas the reverse is true of eukupin.

The best way of administering quinine is, according to Cahn-Bronner, to give 0.5 grams in 5 cc. of a solution made up with urethane. The formula of the fluid is as follows: quinine muriate 2.0; urethane 1.0; distilled water ad. 20.0. Of this solution, 5 cc. contain 0.5 gram of muriate of quinine. Quinine thus injected is not too concentrated, an objection that has been raised against the use of Merck's ampoules of chininum dihydrochloricum carbamidatum (0.3 and 0.1 gram) though these ampules are very convenient for carriage by the general practitioner. The preparation, however, sometimes produces painful infiltrations at the site of injection, and so the more dilute solutions of quinine urethane are to be preferred.

Cahn-Bronner recommends injection of the quinine-urethane solution into the muscles of the thigh. It is important (1) to use a sterile quinine solution that contains no acid, (2) to use a glass syringe freshly boiled (without addition of soda), (3) to disinfect the skin and (4) to avoid moistening the injection needle on the outside with the quinine solution. If these precautions are taken there will seldom, it is claimed, be necrosis or abscess formation.

The adult single dose is 0.5 gram of muriate of quinine. Larger doses are, it is asserted, no more efficacious. The first injection is made as early as possible after the chill, and, if the fever does not fall within twenty-four hours, the injection is repeated. One then waits forty-eight hours and, if the crisis has not occurred, then gives a third injection of 0.5 gram, so that a total amount of 1.5 grams is injected within four days.

Though a careful study of statistics indicates that only about 3.7% of control cases show a cessation of the fever within four times twenty-four hours after the initial chill, on quinine therapy (in 188 cases) no less than 55.5% became fever-free before the end of the fourth day and 25% had aborted within 12 hours after the first injection. The mortality rate reported by Cahn-Bronner was only 6.4% for the cases treated with quinine, whereas in contemporaneous control cases, even after removing from the statistics patients who had entered the hospital moribund, the mortality was 20%. Among the patients that received their quinine injections within the first three days of the disease the mortality was only 5.7%. There was noticed also a marked improvement in the general state of the patient (circulation and respiration). In pneumonias, other than those of pneumococcus origin, it is said that quinine therapy produced no favorable effects.

A comparison of the effects of quinine with those of optochin in lobar pneumonia of pneumococcus origin showed the following results:

Early defervescence with parenteral quinine therapy 55%; with optochin therapy 33.6%.

Mortality, when treatment was given during the first three days, with quinine 5.7%, with optochin 9.5%; in all cases, early and

late, with quinine 6.3%, with optochin 13.4%.

The conclusion reached, therefore, was that quinine therapy was just as efficacious, indeed, somewhat more so than optochin therapy and, moreover, quinine therapy is free from danger to the eyes.

The way in which quinine acts is not, it is admitted by Cahn-Bronner, understood. It certainly has no direct pneumococcicidal effect, but its action is believed none the less to be specific.

Though even with the use of quinine and optochin the mortality rate in lobar pneumonia is still high, nevertheless the reduction indicated by the statistics given would make it seem worth while to make a trial of the quinine therapy, at any rate until sufficiently large numbers of cases have been treated in different epidemics and in different places (with adequate control) to establish the value or the worthlessness of the remedy. It is conceivable, too, that further experimental work may yield a quinine derivative that is even more efficacious than any thus far tried. Results of quinidin in the treatment of auricular fibrillation indicate how important it is to find the exact chemical constitution that is best suited for a specific therapeutic purpose. Until the proof has been brought, however, that quinine or some quinine derivative has, in reality, a specific effect in lobar pneumonia, let us remain sceptical, bearing in mind the fate of the long series of attempts at systematic therapy of this disease in the past.

1035 *North Calvert Street.*

INTRADURAL SURGERY IN ITS RELATION TO ABSCESS OF THE BRAIN.*

By WELLS P. EAGLETON, M. D., Newark, N. J.

Operations for brain abscess originating from the ear and the nose give much better results than operations for brain tumors, as far as the actual curing of the patient and his restoration to usefulness is concerned.

If we drain an abscess, experience has shown that the patient is apt to be almost, if not completely, restored to health; but in the nature of the disease, being a suppurative process, the operative mortality must be higher than that of tumors; that is, not immediate death, but death within a period that is in direct relationship with the operation itself, be it one week or three months. As long as the suppuration is not controlled, the disease for which we operated has not been eliminated.

When a brain abscess originates from the ear, the suppuration enters either from direct extension of the infection passing through the dura or from a retrograde thrombophlebitis of a cerebral vein. In the first instance, the abscess is always situated contiguous to the area of bony caries; in the second, the abscess, while within the cerebral substance, is adjacent to the area of the primary bony involvement; the internal surface of the dura not being affected, there is no adhesion between it and the cortex. In the former case, as the dura is involved from direct extension of the suppurative process, there are adhesions between the brain and the dura.

CLASSIFICATION: *Adjacent* (*Secondary*).* These two types of abscess, because of their location, I have designated as Adjacent (Secondary); adjacent because the abscess is invariably situated adjacent to the primary focus, and secondary because the intradural pathological process is secondary to primary infected process in the bone.

If the process is from direct extension, there may be a tract leading directly through the dura, into the abscess itself. This is an abscess with a stalk. When, however, it originates from a thrombophlebitis, there is no stalk in the earlier stages of the disease, but later there may be, as a stalk may develop from the growth of the abscess outward.

Intercurrent (*Tertiary*) abscess of the brain, either of the temporosphenoidal lobe or cerebellum, may originate from a previous thrombophlebitis of one of the large venous sinuses, the infection having involved first the sinus (as an infective thrombosis of the lateral sinus) and from this extended out into the brain substance by way of one of the veins entering the sinus.

This type of abscess may be situated in any part of the brain, at a considerable distance from the primary focus of infection of the bone. I have designated this type Intercurrent (Tertiary);* intercurrent because the pathological process is carried by blood vessels, and tertiary, because the abscess really follows a secondary suppurative process of one of the large sinuses, which latter was the result of the primary otitis or nasal sinusitis.

Metastatic. In addition, we have metasta-

*Read by title before the Virginia Society of Oto-Laryngology and Ophthalmology at Richmond, April 18th, 1923.

*Eagleton, W. P., Brain Abscess. Its Surgical Pathology and Operative Technic, 1922, Macmillan Co.

tic abscess, in which the abscess originates from the bloodstream itself, being caused by nidus, liberated from an infected area, passing into the circulation and being deposited in one of the small cerebral veins. Metastatic abscesses originate not from arterial emboli, but from venous emboli—that is the nidus is deposited in a small vein where the ebb and flow of the blood and the low pressure of the blood is favorable to the development of a vascular occlusion followed by an infective thrombophlebitis and abscess.

This classification is of importance because it is clinical, it can be helpful in deciding the position of the abscess giving rise, as adjacent, intercurrent and metastatic abscesses do, to absolutely different symptoms during invasion.

Operative Approach: Although an adjacent abscess of the temporosphenoidal lobe is generally easily located surgically and evacuated, at least partially, the operation itself is only part of our surgical problem.

In intercurrent abscess, on the other hand, with our present methods of localization, both clinical and surgical, the position at operation generally cannot be accurately determined. This is especially true in cerebellar abscess as, in an analysis of a large number of cases of post-mortems of abscess of the cerebellum, we have found that the position of the abscesses varies greatly.

However, cerebellar abscess can generally be located by multiple brain punctures. If the only thing necessary were to find the abscess, undoubtedly this could be accomplished in the majority of cases through a small dura exposure.

In cases of abscess of the temporosphenoidal lobe this is especially true, because all of the adjacent abscesses are situated directly over the tentorium, while those of the frontal lobe present even less difficulty, as they almost invariably lie directly behind the frontal sinus. The surgeon is usually able to puncture the abscess after taking away the posterior wall of the frontal sinus.

Factors to be Provided for Before Entering the Dura; Compression and Cerebral Displacement: But the location of the abscess is only the beginning of the surgical problem. The number of abscesses that have been evacuated at operation is very large, but the number that have recovered after location is comparatively small.

An important factor in the surgical treatment of brain abscess that must be planned for before opening the dura is subsequent cerebral compression. Secondary cerebral compression enters only to a limited degree into the post-operative treatment of brain tumors. In brain tumors, edema from the trauma may be met by lumbar puncture, intravenous administration of hypertonic salt solution, or magnesium sulphate by the stomach; and, while the edema may recur once or twice, it will ultimately subside as the compression itself has no influence on the subsequent condition of the brain if its immediate effect can be tided over.

Compression in suppurative diseases of the brain is a different process. If we examine the post-mortem records of brain abscess that have died after being evacuated through a small dural opening, we find that the abscess (or the area of suppurative edema) has extended, and that the cortex over the abscess, between it and the dura, is discolored. In other words, the areas of the brain adjacent to the abscess have begun to be gangrenous; the abscess has extended. This is a pathological fact, the importance of which is not as generally recognized as it should be.

We must prevent, if we can, this lighting up, by the operation, of an encephalitis in a region that is not already infected. To meet this condition before exploration, we should plan a bony flap large enough to be able to see a large area of the cortex and to explore it with the least amount of damage, thus preventing as far as possible a subsequent increase of the intracranial contents by a secondary edema.

These factors can only be met by large bone flaps and large dural openings. Whenever I have deviated from this principle I have invariably regretted it; and although with it many of my cases have died, I still feel the principle is right and that it should be adopted in every case. Without it I have lost several cases which, from the pathological condition and the position of the abscess as found at post-mortem, would have recovered.

In cerebellar abscess, to be able to see every part of the cerebellum, the incision must extend from one mastoid to the other and down the median line of the back of the neck; both flaps turned back, the whole cerebellar region explored, the bone removed and the sinus of the affected side obliterated; after which the dural incision extends from one mastoid to the other. Before opening the dura, a ventricular

puncture must be performed; the whole cerebellar fossa can then be explored and the abscess located with the least amount of trauma to the brain tissue.

Here I want to say a word about the dishonesty of the reports that occur in cerebral surgery. The books are full of statements of which the authors have little knowledge whatever and no experience. This was demonstrated not long ago in looking over a book on surgery in which I found a plate of an osteoplastic flap of the cerebellum that was devised years ago by a European surgeon, on anatomical grounds; he published it. Few cases could possibly recover from the operation for such a flap in the presence of increased intracranial pressure; the patient would die from hemorrhage during its performance. Yet, this description has been repeated in many books. It seems to me it is time that this copying without verification were stopped, for the good of medicine.

In temporosphenoidal lobe abscess an osteoplastic flap must be made, also in frontal lobe abscess. This exposes the dura completely. During this exposure there is apt to be some hemorrhage because the increased intracranial pressure causes the blood to leave the head by the diploic vessels instead of through the normal return venous channels.

The excessive increased intracranial pressure, so frequently encountered in brain tumors is never present in brain abscess, because of the nature of the lesion, yet we have increased intracranial pressure. A tumor is a slow growing process and by the slowness of its growth it gives the brain tissue opportunity to readjust itself. An abscess grows more rapidly and, because of its acute growth and its suppurative nature, can never reach the size often attained by tumors, without killing the patient.

An abscess destroys a part of the brain tissue by suppuration and does not add as greatly to the total bulk of the contents of the dura as brain tumors. Consequently we do not have the excessive bleeding from the skull in brain abscess operations that occurs in cerebellar tumor operations. The dread that I have always had of the profuse bleeding, so frequently seen in cerebellar tumor, has not been warranted during exposure of the dura in brain abscess.

It is after exposure of the dura that the chief surgical problems are presented, for we must prepare for the subsequent compression from increased intracranial pressure that is apt to follow the operation.

It may be asked "if a lumbar puncture relieves the increased intracranial pressure, why is not this a simple way in brain abscess?"

Lumbar Puncture, Its Dangers: We are so in the habit of performing lumbar punctures and they are apparently so free from accident that we have become careless. A lumbar puncture on a normal individual, or an individual suffering from a degenerative disease, syphilis, meningitis, or a lateral sinus thrombosis (any condition in which the pressure, even though increased, is evenly distributed over the whole of the cerebrospinal fluid circulatory system), does not give bad results, although now and then a prolonged reaction occurs for which we cannot account. But in any condition of increased intracranial pressure from an *increase in the brain bulk* itself, a lumbar puncture is dangerous, and in my experience has actually caused a number of avoidable deaths.

It has long been known that abscess of the brain, even without lumbar puncture, is not infrequently followed by a sudden fatal termination. The same thing happens in brain tumor. The explanation usually offered has been that the respiratory centre has been herniated through the foramen magnum, causing paralysis of respiration. An intracranial death is always a blue death.

Cerebral Displacement: I accepted this theory until my attention was called to the frontal lobe abscess as well as the occipital lobe abscess that dies suddenly, neither of which can cause medullary herniation. Post-mortem examinations demonstrated to me that the cause of death is frequently not from prolapse of the medulla alone. The explanation is that increased intracranial pressure from abscess or tumor is associated with displacement of brain substance itself which, if further altered, causes hemorrhage into the vital centres. The death may not be sudden.

Normally the brain is held together by the piarachnoid as in a bag. Its shape is preserved by the vessels running through it; they are very elastic and firm. In a case of gangrenous cerebral herniation, after some of the disorganized brain tissue has been removed by irrigation, I have seen the free vessels rmain, some over an inch in length, still very elastic. They could be stretched an appleciable distance.

In increased intracranial pressure from a *localized lesion* such as abscess or tumor (especially in cerebellar abscess), the vital centres are displaced away from the median line,—away from their normal position. In this displacement the blood vessels are also displaced. On account of their elasticity they stretch. This is possible without hemorrhage, because it occurs gradually, hour by hour, day by day, the process being a slow one. To this alteration in the position of the intracranial contents they adjust themselves. Neverthless, they are abnormally placed, they are under stress: if now a surgeon does an operation and suddenly opens the dura, if extreme cerebral herniation occurs, the delicate vessels may rupture. For some reason the vessels of the pons apparently are the ones that most frequently rupture, and from the branches of the basilar artery hemorrhage also occurs. If the hemorrhage is extensive, there is immediate death: if not, a long period of Cheyne-Stokes respiration with semi-coma and then death.

I believe that nobody has called attention to this condition prior to a communication which I presented before the International Otological Congress last summer.*

If the surgeon performs a lumbar puncture in the presence of cerebral displacement with increased intracranial pressure from an abscess or tumor, he causes exactly the same thing. There is now a combination of suddenly lowered pressure from below, allowing the brain to be herniated through the foramen magnum. At the same time he has altered the already abnormal position of the cerebellar contents, which may cause pontine hemorrhage.

Lumbar punctures in brain tumors or brain abscess have been in my experience attended by several unpleasant surprises. But we should attempt to lower the intracranial pressure before we open the dura, because we may have uncontrollable cerebral herniation. To accomplish this a ventricular puncture may be performed.

Ventricular Puncture: Judging by my experience, ventricular puncture sometimes is different. In supratentorial lesions it is often impossible to locate the ventricle on the side of the lesion, as it may not exist, being obliterated. The opposite ventricle may be either large or small.

When the lesion is below the cerebellum, the ventricles are generally more or less distended and can easily be located.

I have encountered other technical difficulties in ventricular puncture. Once on making a little opening in the dura through a trephine opening there occurred a gush of blood. I plugged it with wax, and it stopped. Whether or not in making the little nick through the dura I cut into a small pial vessel that was immediately crowded into the hole, I cannot say. In another case of increased intracranial pressure I had a loop of pial vessel protrude from the small opening. I "clipped" and replaced it without difficulty.

To reduce the increased intracranial pressure, it is desirable before opening, to give the patient magnesium sulphate by mouth; or an intravenous injection of hypertonic salt solution during the operation.

The combination of ventricular puncture and intravenous injection of salt should allow the dura to be opened with safety, the brain examined, the tract, if there is such, found, and the abscess evacuated through this tract. It may be necessary to perform a lumbar puncture, but we must realize the danger we are running.

Drainage: The question of drainage, to my mind, is one of the most important, next to the exploration itself. All text-books recognize this, but few state that the drainage of abscess, of otitic or nasal origin, must vary according to whether the abscess is chronic with a capsule or acute without a capsule. It is not so much a question of the kind of drainage, as it is of the type of abscess in the given case.

If we have an acute intracerebral abscess without a capsule, we should be decided before we start that we probably will not drain. Our chief object should be to evacuate the abscess; to liberate the pus that is in the cavity of the abscess. There is nothing more to be done. This will horrify many but it is according to surgical principles, for, after the infection has been eliminated as far as possible, to put drainage material into an acute intracerebral abscess without a capsule is simply to place an irritant to the brain which will favor a continuation of the suppuration. Later if the abscess refills, a capsule having been formed, drainage material will have to be introduced.

If you have a chronic abscess with a capsule, it is a different matter. Here an effort should be made not to simply drain, but to eradicate

*Eagleton: "Technical Considerations in the Treatment of Cerebellar Abscess." Trans. 10th International Otological Congress, Paris, 1922.

the suppuration. The whole of the interior of the abscess being cut off, as it were, from the normal brain tissue, it should be cleansed and, as it is obliterated by the pressure of the surrounding tissue, we place drainage material in it. A piece of greased rubber tissue will allow drainage with the least amount of irritation. I have tried fascia lata but, as dead fibrous tissue favors suppuration, I had to remove it on the second day. I believe the carotid artery of a dog would be a good material as it resists suppuration, and would furnish a channel through which to irrigate, if necessary. I have not tried it.

Closure: If we leave the dura widely open, we will lose the case because the piarachnoid must be protected from injury; so it must be closed tightly, except for the smallest possible opening through which the brain protrudes.

After Treatment: I think that the most important thing I have learned during the past year about abscess of the brain is that, if we are to give the patient even a fair chance to recover, the care after operation demands the same forethought and attention to details with which the operation was prepared and performed.

How can secondary compression be foreseen and recognized? Ophthalmoscopic examination should be made at frequent intervals. In but a few cases has the fundus picture been of assistance to me, but in these few cases it has been of the greatest assistance. I do not believe that papilloedema is caused by compression alone, but I do believe that it may be the earliest sign of compression. If a papilloedema appears *after operation* we should be on the lookout; something is wrong. The blood pressure should be taken every fifteen minutes. A rising systolic pressure demands attention. A rising pulse pressure is of grave significance.

If coma deepens, we are justified in performing a ventricular or a lumbar puncture. Meanwhile an intravenous injection of salt or the administration of a solution of magnesium sulphate by mouth may keep the edema down.

Trained Team Work Necessary: Brain abscess should be handled only by a team who are trained to do this work. In every hospital in which there are a large number of cases of traumatic cerebral injury, there should be a special service.* To them should be turned over all head cases on every service. Today I have two assistants, who always help me, an expert anaesthetist who has had experience in head cases, and one trained nurse,—that is a team of five trained people. We are still short one person, as there is frequent need of an assistant to cut a piece of fascia lata or to perform a blood transfusion.

When we think of the many difficulties that may be encountered, it is readily seen that only by team work can we possibly give the patient the best chance. For myself, I will not perform an intracranial operation outside the hospital in which I routinely do this work. I feel that to operate on intradural cases elsewhere is taking an unnecessary chance that may be disastrous to the patient. I am perfectly willing to operate on a patient in deep coma from a brain abscess or trauma in other hospitals. They have at best a poor prospect of recovery, and to remove them might invalidate this. But in cases in which the patient is not in coma, I insist that they be brought to the place where the team works.

Results: From the text books one would think that from fifty to seventy per cent. of brain abscess recover. But all large compilations of cases show that less than fifteen per cent. of all the cerebellar, and less than forty per cent of all the temporosphenoidal lobe abscesses have recovered. Even this, in my opinion, is too high, because it takes a great deal of courage to report successive failures, while every successful case is so brilliant that it is sure to be reported.

Prognostic Significance of Multiple Lesions: It is a clinical fact that the greater the number of lesions present at the time of operation, the less the hope of recovery. A sinus thrombosis prior to the formation of brain abscess is a predisposing cause of death, although the mortality from it alone is not high. An associated meningitis almost invariably terminates fatally, although a few cases have recovered, but the association of sinus thrombosis, brain abscess and infective meningitis offers little hope of the patient's recovery, even though the abscess is evacuated. Deep location of the suppuration, or acute abscess, and encephalitis, all are unfavorable conditions. We know that even if the abscess has been properly evacuated, the patient is apt to die. In any case the patient has but one real chance; we cannot afford to lose a single technical trick during or after the operation.

15 *Lombardy Street.*

*Eagleton, W. P. "Operative Treatment of Suppurative Meningitis by Subarachnoid Irrigations." Second paper. Atlantic Medical Monthly. June 1923.

RECENT ADVANCES IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS.*

By WARREN T. VAUGHAN, M. D., Richmond, Va.

The serologic study of syphilis has become so extensive that in large medical hospitals and clinics the Wassermann reaction has been made practically routine. Coincident with the development of routine tests for syphilis, clinicians have come to rely more and more upon the laboratory for their diagnosis and have neglected the methods of physical examination and analytic diagnosis. In the past when syphilis was suspected, a thorough search was immediately instituted for any and all signs or stigmata suggesting this disease. How much easier it is to await the laboratory report and thereupon establish or eliminate syphilitic infection!

Not only is routine laboratory technic not infallible, but furthermore, there are without doubt not a few cases with truly negative Wassermann reactions. These cases will be misdiagnosed if too great reliance is placed upon the laboratory examination. Pride in one's ability to recognize disease should impel one to make a thorough examination and to establish the tentative diagnosis, even before receipt of the laboratory report. If the report is then found to be at variance, it is still possible that the laboratory is in error. It is then that judgment, that rare virtue so necessary to the diagnostician, becomes of paramount importance.

Perhaps the condition most frequently met with, in which the patient although actively syphilitic shows a negative blood Wassermann, is chronic advanced syphilis of the central nervous system. Here the spinal fluid will usually show a positive reaction.

Marcel Pinard describes a case with multiple, painful exostoses without signs of syphilis and with a negative Wassermann and Hecht reaction, but which subsequent events showed to be a case of heredosyphilitic infection. The initial symptoms appeared at the age of 22, following trauma. As the exostoses became more numerous, syphilis was suspected and the blood was tested and found to be negative. The spinal fluid Wassermann was also negative. Under antisyphilitic treatment the symptoms rapidly disappeared.

The same author has recently reported an even more interesting case. A pregnant woman of 35, with headaches, facial paralysis and albuminuria, presented herself for diagnosis. Syphilis was suspected and a Wassermann was done on three occasions, and by three different serologists, each time with negative results. The woman at term gave birth to an infant showing all of the classical signs of congenital syphilis, with skin eruption, snuffles, etc.

Two children from a previous marriage were examined and in both were found the characteristic signs of heredosyphilis.

This woman had suspected syphilis before her second marriage and had consulted a physician who made blood tests and then informed her that she was "une malade imaginaire." The patient remarried, therefore, with medical sanction, and continued to produce hereditarily syphilitic children.

Pinard draws attention to the unfortunate circumstances resulting from a medical attitude of mind which depends entirely upon the result of the Wassermann reaction for guidance, and emphasizes the importance of searching for evidences of syphilis among other members of the family, a search which often furnishes information which the serologic reaction withholds.

The value of the Wassermann reaction in serologic diagnosis is unquestioned, but the method is not without its real disadvantages. The various ingredients entering into the complement fixation reaction must be titrated with the utmost precision. Antigens are known to be variable. Complement tends to deteriorate with relative rapidity and since the interpretation of the test depends upon the disappearance of complement activity, its deterioration may be mistaken for fixation. Again, serum is occasionally either wholly or partially anticomplementary. Furthermore, many sera contain a natural hemolysin, the presence of which leads to erroneous negative conclusions. These and many other technical difficulties undoubtedly explain why, in spite of the fact that the Wassermann reaction has now been in use more than fifteen years, it is not, as yet, wholly dependable.

The fact that alcoholic extracts of non-syphilitic organs may be used in the test has discredited the specific antibody conception of the reaction. It is chiefly this fact that has inspired recent attempts to simplify the technic. The earlier interpretation of the Wassermann reaction as an antigen-antibody re-

*Read before the South Piedmont Medical Society, Danville, Va., April 18, 1923.

action has been questioned and it has been suggested that the phenomena observed are based on colloidal reactions. In 1907 several investigators suggested that a precipitate is formed in the positive Wassermann test and Jacobstahl showed with the ultramicroscope that such a precipitate actually is present when a mixture of Wassermann antigen and syphilitic serum is incubated for one and one-half hours. Attempts to produce a visible precipitation as indicative of syphilitic infection were first successfully carried out by Lange who developed the colloidal gold reaction. Of the ten or more precipitation or flocculation reactions that have been more recently described, the Meinicke, the Sachs-Georgi and the Kahn reactions have, because of their relative simplicity and because of their high correlation with the Wassermann test, received especial attention and study.

It has been shown that the globulins in syphilitic serums and spinal fluids are increased above the normal, and the precipitation occurring in the various tests is supposed to be a reaction between seroglobulins and lipoid extract such that the resulting flocculate is a lipoglobulin aggregate. The Sachs-Georgi reaction is one of the simplest so far proposed. The technic consists in the incubation for from eighteen to twenty-fours of a mixture of inactivated serum, sodium chlorid and cholesterinized heart extract. A positive reaction usually occurs at the end of that time although the tubes are customarily allowed to remain at room temperature overnight, when a second reading is taken. The test has been compared with the Wassermann reaction in over thirty-one thousand cases and in the aggregate there was an agreement of 86.9% in all tests performed by various workers.

The main difficulty with both the Meinicke and Sachs-Georgi reactions lies in the fact that the end results are read after forty-eight hours incubation, at which time the serums frequently show sufficient contamination to lead to false interpretations. The Kahn reaction is read after a much shorter interval and is even further simplified. In it the final precipitate is easily seen with the naked eye and in strongly positive serums spontaneous flocculation occurs, enabling interpretation as soon as the reagents are thoroughly mixed. Serums are mixed with small amounts of diluted cholesterinized antigen and with non-cholesterinized antigen and the mixture is then vigorously shaken for three minutes. Sometimes at the end of this period a positive reading may be had, although as a rule readings are made after incubation overnight. The possibility of standardizing this type of reaction is increased by the fact that only one reagent is added to the serum. Young, in reporting a comparison between the Kahn and Wassermann reactions in five thousand and eighty serums, found an agreement of 93.03 per cent. between the two reactions.

Serologic examination for the presence of syphilis has become so generally relied upon that any method which will increase the accuracy of the test should be utilized. Standardization of the original test is of the utmost importance. Other simpler reactions such as the Kahn and Sachs-Georgi test may be used for confirmatory evidence. It may be that ultimately some simpler flocculation reactions will entirely supplant the Wassermann test. In the meantime, it must be borne in mind that the mechanism of none of the reactions is accurately known. We cannot explain why in syphilis and in practically no other disease some change has been produced in the blood serum by which the precipitation reactions will become positive.

When salvarsan was introduced into the medical world, the details of its administration had been already worked out. Ehrlich, after having chemically perfected the spirocheticide, had had its action tested on thousands of individuals in several of the best German clinics, so that when the treatment came into general use the experimental phase had been passed, and the dosage and manner of administration had already been worked out in detail. In this way unfortunate accidents in the hands of inexperienced physicians were to a great extent avoided.

Nevertheless, there have been several important and valuable changes in the method of arsphenamine therapy during the last ten years. In the treatment of syphilis, it was soon discovered that the "therapia sterilisans magna," which had been satisfactorily employed in animals, could not be reproduced in man. Our inability to destroy all of the spirochetes in the body with one massive intravenous medication has rendered it necessary to administer repeated doses. The question of dosage in the treatment of syphilis has therefore become extremely important.

Ehrlich, in his original work on trypanosomes, recognized that in those cases not entirely cured by the first treatment, relapses were even more difficult to cure. Treatment which had been unsuccessful in a first attempt was usually unsuccessful on repetition. Repeated treatments, none of which cured entirely, were often found to have progressively less influence on the activity of the infecting parasite. A condition of "Festigheit," increased tolerance or resistance to the action of the drug, had been produced.

The possible development of "drug-fastness" by the infecting agent, in individuals undergoing antisyphilitic treatment, is now recognized as an important feature and a phenomenon to be avoided if possible.

A contribution of considerable significance has been made recently by Bronfenbrenner and Schlesinger, who found that minute doses of arsphenamine, instead of inhibiting the progress of the spirochetal infection, actually caused the disease to progress more rapidly and more extensively in the animals so treated than in other animals similarly infected but not treated at all. Bronfenbrenner and Noguchi found some time ago that minute amounts of arsenic present in culture media stimulated the growth of spirochetes. Very minute quantities of arsphenamine appear therefore to be of less value than no treatment at all. The phenomenon appears analogous to that found in the treatment of cancer by the roentgen ray, where small doses stimulate the cells to proliferation while larger doses destroy. Bronfenbrenner and Schlesinger point out that this stimulative action of minute doses of arsenical compounds is not to be confused with the development of increased tolerance, but is characterized by an actual increase in the rapidity of multiplication of the parasites.

The dosage used by these investigators is, of course, extremely small and it does not follow from their report that the occasional small doses used therapeutically in the treatment of syphilis have a stimulating action. It is quite probable that even these small doses are sufficiently large that they inhibit multiplication. This in indicated by the customary diminution in the intensity of the positive Wassermann reaction and clinical improvement.

Brown and Pearce have shown in a recent article that insufficient treatment with arsphenamine or neoarsphenamine may alter the immunologic status in experimental animals to such an extent as to favor the development of a second or superimposed infection without a cure having been accomplished for the first. They inoculated rabbits and, after the development of the primary lesion, treated the animals with single massive doses of arsphenamine or neoarsphenamine. The primary lesions as a rule retrogressed and in some instances disappeared. Reinoculation, at a time when the drug was no longer present in the body in sufficient amounts to produce an effect, and when the original primary lesion had practically disappeared, produced in most of the rabbits a second primary lesion at the site of reinoculation. In the majority of the animals the original infection had not been entirely destroyed and, as the original parasites once again commenced to multiply, chancres developed both at the site of the original inoculation and the site of reinoculation.

It has long been held that individuals once infected with the spirochete of syphilis are immune to reinfection as long as the germ remains active in the body. Reinfection usually is assumed to be evidence that the patient had been cured of the former infection. The work of Brown and Pearce shows quite conclusively that experimentally, at least, an individual may become reinfected with syphilis even though the original invaders are still living in his tissues. Similar phenomena have occasionally been reported in man.

How frequently the factors discussed above will become of importance in the treatment of syphilis is uncertain. Certainly the standard doses in use in the large clinics have proved their worth. But that they are the ideal dosage does not follow. There is a tendency with many to give relatively smaller doses of arsphenamine or neoarsphenamine than formerly. Past experience and recent laboratory observations appear to be of accord in indicating that the dosage in antisyphilitic treatment should be as high as safety permits.

The standard intravenous dose of arsphenamine is 0.6 gm., that of neoarsphenamine 0.9 gm. These quantities appear to be sufficiently large for satisfactory therapeutic results and yet are not so large that they cause untoward results. They contain about equal amounts of arsenic and are supposed to have equal therapeutic value. The majority of critical

observers have found, however, that there is a difference in the effectiveness of the two drugs when given in these doses. Most syphilologists have concluded that arsphenamine produces prompter results and is less liable to be followed by relapse. The popularity of the second preparation is due to the greater ease of administration, a factor which should play a less important role than it actually does. In nearly all of the armies, during the war, syphilis was treated with neoarsphenamine. This was undoubtedly due to the greater ease, and shorter time required for administration, thereby facilitating the treatment of larger numbers of individuals, and to the fact that considerably less apparatus was required. Rightly or wrongly this has given an official sanction to the use of neoarsphenamine.

Considerable experimental work has been done within recent years to determine if possible the comparative value of the two drugs. Schamberg, Kolmer and Raiziss, working with trypanosomes, found that the trypanocidal activity of arsphenamine was 1.74 times that of neoarsphenamine. Castelli and others, working on trypanosomiasis, spirillosis, and rabbit syphilis reached similar conclusions, finding that the activity of the former was between 1.5 and 1.78 times that of the latter. If we are to accept these results we should conclude that therapeutically 0.6 gm. of arsphenamine is not equivalent to 0.9 gm. of neoarsphenamine, but rather to 1.05 gm. The therapeutic activity of 1.05 gm. of neoarsphenamine is equivalent to that of 0.6 gm. of arsphenamine.

The trypanocidal dose of arsphenamine (dosis therapeutica) is 4.564 times less than the highest tolerated dose, (dosis tolerata). On the other hand, the therapeutic dose of neoarsphenamine is 6.35 times smaller than the highest tolerated dose. The latter is, therefore, a safer drug, the margin of safety between the two doses being distinctly greater. This is true even if 1.05 gm. instead of 0.9 gm. of neoarpshenamine should be used.

The average *minimum effective dose* for arsphenamine is 3.1 gm. per kilo body weight; for neoarsphenamine, 3.4. These two doses are approximately the same. *The minimum lethal* dose on the contrary is 53.2 for arsphenamine and 96.5 for neoarsphenamine. Once again we see a wider margin of safety in the latter drug. Voegtlin and Smith designate as the "therapeutic ratio," the ratio $\frac{\text{M. L. D.}}{\text{M. E. D.}}$ For arsphenamine this is 17.2, and for neoarsphenamine 28.4. The higher the ratio, the less danger is there in administering the drug in amounts greater than the M. E. D.

These experimental observations coincide with clinical knowledge that toxic reactions occur less frequently after large doses of neoarsphenamine than after corresponding doses of arsphenamine.

Schamberg, Kolmer and Raiziss have made a study of the relative toxicity of the two drugs. They found that for rats and mice neoarsphenamine is about 2.4 times less toxic than is arsphenamine. They conclude that, as far as is indicated by intravenous experiments on rats, the usual dose of 0.6 gm. of arsphenamine is about 12 times less than the highest tolerated dose, while 0.9 gm. of neoarsphenamine is 19 times less than the highest tolerated dose for the latter drug. Here again the conclusion is that larger amounts of neoarsphenamine are of less danger than are proportionate amounts of arsphenamine.

It is well known that neoarsphenamine may be given with safety at shorter intervals than arsphenamine. Will it not be true then, that if the former drug is administered in slightly larger doses and somewhat more frequently, say 0.9 gm. thrice weekly, equally good therapeutic results will be obtained? This raises a question as to whether the difference in therapeutic results is due merely to a difference in dosage or whether it depends on a chemical difference between the two drugs.

Schamberg concluded from comparative studies that the addition of the formaldehyde sulphoxylate group found in the neoarsphenamine may lessen the affinity of this drug for the protoplasm of the parasite, but at the same time lessening the affinity for the body proteins to an even greater extent. This hypothesis would explain both the diminished therapeutic effect and also the decidedly lessened toxicity. Another phenomenon bearing on relative toxicity is the observation by Schamberg that arsphenamine in practically all concentrations hemolyzes red blood cells *in vitro*, while neoarsphenamine does not do so in any concentration clinically employed. Schamberg has concluded that arsphenamine is more active therapeutically but that this advantage is balanced by the much higher toler-

ated dosage of neoarsphenamine and by the fact that the latter is less likely to cause biochemical disturbance in the blood and the tissues.

The preceding review indicates fairly clearly the unsettled status of arsphenamine and neoarsphenamine dosage. At present there is sufficient evidence to justify those who prefer to use the simpler technic of neoarsphenamine therapy, but only on the condition that sufficiently large and frequent doses be administered.

There is some diversity of opinion as to what therapeutic procedure may best be followed in obvious nervous system infection. In general, three views are held. First, that intravenous medication alone produces satisactory results; second, that intravenous medication should be combined with spinal drainage; and third, that the administration of salvarsanized serum intraspinally produces the greatest benefit.

The performance of spinal fluid drainage after intravenous treatment was originally based on the assumption that with reduced intraspinal pressure the arsphenamine circulating in the blood will diffuse more readily into the subarachnoid space. Dercum claims better results than by the Swift-Ellis method, due he thinks, to the more thorough drainage. Every possible drop of fluid is removed each time. Theoretically, the rapid removal of fluid will produce a relative hyperemia of the cord and brain with resulting improved nutrition to the parts. Dercum draws an analogy to the Bier method of hyperemia as used in surgery. If his theory is true, drainage alone, irrespective of intravenous treatment, might improve the nutrition of the central nervous system with resultant spontaneous improvement.

The presence of arsphenamine in the spinal fluid, according to Dercum, is of no significance and probably plays no part in the good results obtained. The difficulty in syphilitic medication lies not in the failure of passage of the spirocheticide through the choroid plexus into the subarachnoid space, but in its failure to pass through the walls of the capillaries situated in the nervous tissue, into the parenchymal cells where the chief damage takes place. The hyperemia resulting from spinal drainage would increase any such tendency to pass through the capillary walls.

Fordyce, who is an ardent advocate of the Swift-Ellis method of treatment, takes vigorous exception to Dercum's conclusions. He points out that Swift and Ellis did not develop their method under the mistaken idea that the nervous system received its nutrition from the spinal fluid, but rather because intraspinal therapy had been successfully employed in the treatment of cerebrospinal meningitis. Many forms of neurosyphilis have their site in the meninges and are limited to these structures. Meningovasculitis cannot always be differentiated clinically from paresis and in most cases of true paresis there exists at the same time a meningitis. Positive spinal fluid findings in central nervous system syphilis are due usually to meningeal involvement and this can best be treated by the direct application of a spirocheticide. The more pronounced the luetic meningitis, the more marked will be the benefit derived from intraspinal medication. Fordyce states that numerous cases have been entirely cured and many greatly benefited by Swift-Ellis treatment after the failure of those methods so strongly advocated by Dercum and others. Numerous cases of progressing optic atrophy have been permanently arrested by intraspinal medication after the failure of prolonged intravenous treatment.

The prevention of late neurologic accidents in syphilis does not depend solely upon a recognition of early invasion. The theory that inadequate treatment predisposes to late nervous involvement has been discussed in some detail by Keidel. Little is known with regard to immunity in syphilis but we have considerable indirect evidence that the human body does develop some degree of immunity against the treponema pallida. The observation of Colles regarding the apparent immunity of the pregnant mother and that of Profeta, that a "non-syphilitic" child born of syphilitic parents appears immune, were the first observations based on such a conception. As a rule a syphilitic cannot be superinfected. Pearce and Brown have shown experimentally that insufficient treatment will destroy this immune mechanism and that a second chancre may then be produced even while pathogenic microorganisms persist in the first. They have proposed two "laws," both of which aid in an understanding of late neurosyphilis following inefficient treatment. According to the "law of progression," various tissues of the body are not equally susceptible and reactive to

syphilitic infection. Some groups are more susceptible than others, and with a progressing infection there is an orderly sequence from one group to the next. Interference with the course of the infection, as by treatment, may protect some tissues, but unless persisted in may fail to protect tissues higher in the scale. Reidel observes that certain tissues with relatively high resistance to invasion show little defensive reaction after finally becoming involved. If these observations are applied to the central nervous system, the latter tissue may be considered relatively insusceptible to invasion with the spirochete, and at the same time unable to satisfactorily develop an immunity reaction when it does become so invaded. Thus the nervous system must depend for its protection upon the presence of immune bodies derived from other tissues. With destruction of the treponema, the general immunity reaction becomes less vigorous and the nervous tissues more easily fall prey to the invading parasite.

The second law formulated by Brown and Pearce, "the law of inverse proportions," assumes an inverse quantitative relationship in the intensity of consecutive reactions in syphilitic infection. Thus in the primary sore, a defense reaction is set up. If this is vigorous and the chancre is extensive, the later manifestations are likely to be milder if they appear at all. Conversely, with a small, nonreactive chancre, the secondary and tertiary phenomena are usually more extensive. It has long been observed that in secondary syphilis with extensive cutaneous manifestations, central nervous infection is less apt to occur, whereas with but slight cutaneous involvement, later neurosyphilis is more frequent. Treatment which mitigates the severity of the primary and secondary reactions without completely eliminating the infection may predispose to involvement of those more highly resistant tissues such as the central nervous system.

Thus we may use the term accurately when we speak of prophylactic treatment of neurosyphilis. The efficiency and completeness of treatment of the primary and secondary lesions appears to be of considerable importance in determining later neural infection.

The weight of evidence indicates that intraspinal administration of salvarsanized serum has a distinct field and should be employed in all cases in which intravenous treatment has not satisfactorily cleared up the central condition. For satisfactory results intraspinal treatment must be begun early. Tabes and taboparesis when usually recognized are past cure and usually past improvement. The future hope of therapeutic advancement in this field consists in early recognition of neural involvement and intensive treatment before the appearance of localizing signs or symptoms. The routine which I have followed consists in the giving of an initial course of intravenous therapy, followed by re-examination of the spinal fluid. If improvement is noted, the method of treatment is not changed. If no improvement in the spinal fluid findings has occurred, intravenous treatment is reinforced by intraspinal therapy, using the Swift-Ellis technic. In cases of early secondary syphilis it is safer to give three or four intravenous treatments before performing the initial lumbar puncture, so as to lessen the hazard of meningeal invasion subsequent to the puncture itself.

A negative blood Wassermann does not rule out central nervous system syphilis, even in those cases who have had no anti-luetic treatment. In case of doubt, a diagnostic lumbar puncture will give valuable information. The intrathecal pressure should be roughly estimated, cell count and globulin content should be recorded, and Wassermann reaction should be determined. I have also been employing the colloidal gold reaction as a control for the Wassermann. It is important to use amounts of fluid up to 2 c.c., in the Wassermann test, so that a week positive will not be overlooked.

No case of syphilis can be said to be successfully protected against late neurosyphilis until the spinal fluid has been studied and found to be normal.

Early treatment of neurosyphilitic lesions, before the development of localizing signs, offers the only promise, at present, of satisfactory therapy. Spinal fluid examination affords the only means of recognizing this early involvement.

Every syphilitic should have at least one lumbar puncture performed, early in the course of his disease.

The use of bismuth in the treatment of syphilis was developed in France chiefly through the efforts of Sazerac and Levaditi, who recognized the value of the earlier uncompleted work of Sauton and Robert of the

Pasteur Institute. The preliminary observations made by Sauton and Robert were published in *Annales de L'Institut Pasteur* in 1912. No further experimental work was performed until after the war when, in 1921, Sazerac and Levaditi published their preliminary observations. In January, 1922 a symposium on the use of bismuth in the treatment of syphilis appeared in the *Annales de L'Institut Pasteur*. Between January and December, 1922, twenty-seven articles on the use of bismuth in syphilis have been recorded in the *Quarterly Cumulative Index*, coming from the following seven countries: Argentina, Denmark, Italy, Brazil, Uruguay, Germany and Switzerland. During the same period the treatment was not discussed in the American medical press.

Fournier and Guenot have collaborated with Sazerac and Levaditi in the clinical use of sodium-potassium-tartrobismuthate. They give the drug intramuscularly in a 10 per cent. suspension in olive oil and emphasize the importance of depositing it into the muscles rather than subcutaneously. The latter method is decidedly more painful while the inconvenience from intramuscular injection is no greater than that observed after intramuscular mercury. A total of two or three grams of bismuth should be given during the first month of treatment. Two or three injections of 0.2 grams are given daily, after which the patient receives 0.3 grams twice weekly throughout the month. After this period, treatment may be continued with weekly injections of 0.2 to 0.3 grams or the patient may be allowed one month rest, after which the regular course is repeated. The only necessary precaution for the patient to observe is a careful hygiene of the mouth.

Under this treatment spirochetes disappear from the primary sore after the first to the third injection. The chancre becomes completely healed within five to twenty-five days, usually within two weeks. The Wassermann reaction, if negative at the initiation of treatment, usually remains so. If positive, the strength of the reaction falls as satisfactorily, or perhaps more so, than after the use of arsphenamine.

Bismuth is particularly useful in the contagious stages and, according to the authors, causes more rapid and complete disappearance of the contagious lesions, than does arsphenamine. In secondary syphilis the cutaneous lesions disappear as a rule within a week. The strength of the Wassermann reaction is very favorably influenced, becoming practically negative within two or three months as a rule, but varying considerably as with other forms of treatment. Tertiary lesions improve with almost equal rapidity. This is particularly true of gummata and tertiary skin and mucous membrane manifestations. The authors report no conclusive observations on visceral or nervous syphilis.

No untoward effects from the use of bismuth have been reported other than a tendency toward stomatitis similar to but usually not as severe as that following the use of mercury. A marginal pigmentation usually appears in the gums, analogous to the familiar lead line. The stomatitis is usually a fuso-spirillary infection similar to that of Vincent's anginia. It is satisfactorily treated by the methods customarily employed in Vincent's angina and may even be rapidly cured by the local application of the tartrobismuthate in powder form. Bismuth appears in the saliva but in an altered form, probably combined with sulphur, in which it has lost its spirillicidal properties.

The immediate results from the injection of bismuth compounds in syphilis appear from the published reports to be as good as or better than those obtained with mercury and arsenic compounds. In any case, the drug will be valuable for alternate use with the latter, in those cases where the infecting parasite has apparently acquired a degree of tolerance to the drug. It will be several years before the end results from bismuth treatment can be comprehensively tabulated. In fact it has not been until recently that we have come to realize the significance of the late unsatisfactory accidents from standard treatment with mercury and arsphenamine.

The discovery of the treponema pallida by Schaudinn and Hoffmann, the cultivation of the spirocheta by Noguchi, the application of the Bordet-Gengou phenomenon to the serologic diagnosis of syphilis by Wassermann and the preparation of salvarsan by Ehrlich have concentrated our attention on attempts to rid the body of the spirochete and to obtain a serologic cure, and have diverted our thoughts from the patient as an individual, so that in many instances we have lost sight of the importance of clinical cure. This is

often not obtained until long after the Wassermann reaction has become negative.

To summarize the treatment of syphilis in a few words, I would emphasize two general facts which may appear mutually antagonistic. The eradication of syphilis in the individual case is not always indicated by the obtaining of a negative Wassermann reaction. Sometimes, particularly in nervous system involvement, the patient is still actively syphilitic and suffers from a progressive disease even though the blood reaction is negative. In these cases treatment which is discontinued on a negative laboratory report is incomplete. It is the disease and not the laboratory reaction that should be treated.

On the other hand, there is a disposition on the part of many to treat the patient too vigorously in their effort to obtain a serologic cure, so that the general condition suffers from the poisoning of medication. Here it is often better not to attempt to obtain a negative Wassermann reaction. In individuals who are Wassermann fast, the treatment is sometimes more disastrous than the disease. This is often also true in elderly individuals or patients with advanced myocardial degeneration, aortitis, etc.

Here we are faced with a dilemma. Some patients with negative Wassermanns are not cured and need more treatment. Others, whose Wassermanns are still positive, should receive no further treatment. How may we determine whether to go farther or to stop short? The answer to both phases is summed up in the dictum, treat the patient rather than the disease. The laboratory tests are of inestimable value but of greater value still is attention to the clinical course of the patient's illness.

404 *Professional Building.*

SOME RESULTS OF PROTEIN SENSITIZATION WORK IN BRONCHIAL ASTHMA, HAY-FEVER AND ALLIED CONDITIONS. REPORT OF CASES.*

By GRAFTON TYLER BROWN, M. D., Washington, D. C.

A year ago I read a paper[1] before this Society, reviewing in a brief way protein sensitization work and reporting my own case. I feel that it might be of interest and possibly of some benefit to relate to you some of my own results.

*Read before the Medical Society of the District of Columbia, March 21, 1923.

1. Brown, G. T.: Protein Sensitization in Bronchial Asthma, Hay-Fever and Allied Conditions. With Report of Writer's Own Case, Va. Med. Mo., 49:188 (July) 1922.

Bronchial Asthma.

By means of a careful history and cutaneous tests, bronchial asthmatics may be roughly classified into the following groups: food, animal epidermal, bacterial, pollen, miscellaneous inhalants (orris root, etc.), and non-sensitive. In the limited time at my disposal it will only be possible for me to report one case as illustrative of each of these groups.

Food Asthma.

Case 1. Mr. J. T. M. Age 62 years. Referred by Dr. Welburn. Had severe asthma for about twenty years, accompanied by a very productive and troublesome cough. Attacks came on suddenly. Worse in summer. Also had symptoms of hay-fever. Whenever he went in a field where they were cutting wheat or to a mill where they were threshing it, he would be unable to sleep all night because of asthma and hay-fever. He gave large reactions to the proteins of wheat flour and tomatoes, and lesser reactions to the pollens of wheat and rye. I advised him to completely eliminate wheat and tomatoes from his diet and gave him a sputum bottle, feeling that an autogenous vaccine was indicated because of the severe bronchitis. A week later he brought back the empty sputum bottle and reported that he was entirely free of all asthma, cough and expectoration. He has remained free to date, a period of eight months, with the exception of a few isolated attacks following exposure to wheat, *i. e.*, one attack followed going through a wheat field, another followed repairing a flour sifter. In this case wheat flour undoubtedly acted both by inhalation and ingestion to produce symptoms.

Animal Epidermal Asthma.

Case 2. Mr. D. W. L. Age 32 years. Referred by Drs. Hazen and Eichenlaub. Asthma, perennial hay-fever, and eczema. Asthma started at about 9 years of age. Hay-fever and eczema started at about 12 or 13 years of age. Family history negative as regards sensitization. Patient stated that if he went to the theater where they had an animal act with horses, or to a parade where there were horses, or if he rode behind a horse he would have severe asthma and hay-fever. His occupation as foreman of a coal company, with

teams passing in and out of the yard almost continuously, brought him more or less intimately in contact with horses. On his vacations, when he would visit his mother and father in the mountains, where there were no horses, he would be entirely free of asthma, hay-fever and eczema. On his last visit, however, they had gotten a horse, and he had asthma, hay-fever and eczema the entire time he was there. Whenever his asthma and hay-fever were worse, his eczema would also be worse. Patient was so miserable most of the time, that he had contemplated suicide. Has taken about eighteen X-ray treatments for eczema and has had two negative Wassermanns. A few tests for protein sensitization were performed in October, 1920, by Dr. Ketron, of Baltimore, who found him very sensitive to horse dander. On thoroughly testing him, I obtained a four plus reaction to horse dander and lesser reactions to a number of other substances. Treatment with horse dander protein extract has completely relieved him of asthma and hay-fever, but has had little effect on the eczema, and elimination of the various other substances to which he reacted apparently had no effect. In spite of a large number of treatments with horse dander protein he still gives quite a marked cutaneous reaction to the same. I believe this incomplete desensitization accounts for the persistence of the eczema.

Bacterial Asthma.

By bacterial asthma, I mean asthma due to sensitization to protein contained in the bodies of bacteria.

Case 3. Mrs. G. C. Age 33 years. Referred by Dr. Le Comte. Patient had influenza in 1917, which left her with a very severe cough and hemoptysis. Was told by a physician that she had pulmonary tuberculosis and was sent to Asheville, N. C. This diagnosis was unconfirmed by specialists there and she returned home. Then asthma set in, which she has had steadily ever since, a period of about five years, accompanied by a very troublesome bronchial cough. Asthma always worse at night, in fact she had not had a whole night's sleep in five years. Very susceptible to colds, which always aggravated the asthma and were accompanied by ulceration of her throat and enlargement of the cervical lymph glands. Treated by competent nose and throat specialists the latter part of 1919. X-ray of teeth, negative. Took osteopathic treatments from February, 1920, until October, 1921. About March 1, 1922, she developed what appeared to be angioneurotic edema, affecting her ankles, hands, lips and eyelids. Her skin had become very rough, split around finger nails, and cracked and bleeding between toes. Urine negative. Blood and spinal fluid Wassermann negative. On testing her I obtained a very marked reaction to the protein of streptococcus hemolyticus, and lesser, though quite definite, reactions to wheat flour, tomatoes, peas, turkey and a few other foods. An interesting feature of her food reactions was that they were all delayed, *i. e.*, did not appear until several hours after the tests were made (food reactions almost always appear within five to thirty minutes). Her reaction to streptococcus hemolyticus did not appear until the next day and was of the inflammatory type with no wheal formation, but I have found this to be the rule with bacterial reactions. She was advised to completely eliminate from her diet all foods to which she had reacted. Examination of two separate specimens of her sputum showed it to contain a weakly hemolytic streptococcus in practically pure culture, from which a vaccine was prepared, and she was treated with the same. Under this treatment her asthma cleared up very promptly and she remained entirely free for a period of four months. The edematous swellings disappeared following the second or third treatment. Her skin resumed its normal texture, with a disappearance of the splits and cracks about the fingers and toes. Then she went in swimming one day, got her hair soaking wet, and rode around in an open machine. As a result she had an acute attack of pleurisy and congestion of the lungs, followed by a return of her asthma, though in a much milder form. I retested her with bacterial proteins and she gave only a doubtful reaction to streptococcus hemolyticus, but quite a marked reaction to staphylococcus aureus.

Examination of her sputum at this time revealed staphylococcus aureus and streptococcus hemolyticus in the proportion of about 4 to 1, and a vaccine was prepared containing these organisms in the same proportion. Since the first treatment with this vaccine she has been free of asthma, with the exception of a few isolated attacks following the ingestion of some offending food, such as wheat flour or

tomatoes. Has gained about 23 pounds and, other than being a little wheezy, at times, when she has a cold, looks and feels wonderfully well. On a very recent test she gave only a slight reaction to staphylococcus aureus, and streptococcus hemolyticus was absolutely negative.

Pollen Asthma.

Seasonal pollen asthma, especially as an accompaniment of seasonal hay-fever, is so commonly met with that I will report instead under this head a case of non-seasonal pollen asthma.

Case 4. Mr. E. S. Age 30 years. Referred by Dr. Cissel of Highland, Md. Asthma. First attack started in fall about three years ago and lasted until the following March. Was living in White Plains, N. Y., at the time. Second severe attack started in March, 1922, left him some time in April, then returned the latter part of May or first of June and had been very bad ever since up to September 1922, when I started to treat him. Spent two weeks in hospital because of asthma. In between these very severe attacks he would be wheezy. Asthma worse at night. No difference between warm and cold, or dry and damp weather. During severe attacks took from 10 to 15 minims of adrenalin chloride hypodermically every three hours. This nearly always relieved him, but only for about three hours. No relief from inhalation of fumes from asthma powders. No symptoms of hay-fever, *i. e.*, no itching of eyes and only an occasional sneeze. Very susceptible to colds, which aggravated asthma, in fact seemed to have a cold nearly all the time. Wheezed a good deal and was scarcely able to move during bad attacks. Weight 117 pounds. On testing, found him sensitive to sweet vernal grass, red top, orchard grass, chicken feathers, cat and dog hair. Had cats and dogs about the house at this time, but was not exposed to cats or dogs when he had his first severe attack in White Plains, N. Y. Floss pillows were substituted for feather ones, and we felt that some improvement followed this change. Treatment was started September 28, 1922, with the three grass pollens to which he had reacted and his asthma cleared up almost immediately, and he has remained free ever since, with the exception of being a little wheezy when he has a cold. Is now doing the hardest kind of work with no shortness of breath on exertion, and states that he feels better than he has for over 5 years. Present weight 142 pounds, a gain of 25 pounds.

Comment: I know there are a number who will deny that grasses, ragweed, etc., can cause asthma at other times than during their period of pollination, but the fact remains that I have seen a number of these non-seasonal cases who give definite reactions to pollens, and treatment with the pollen or pollens involved relieves them of asthma; again, too large a treatment aggravates the asthma. A possible explanation of this would be that there is sufficient pollen lying around in dust to cause symptoms on inhalation at any time of year. However, it would seem that if this were so, the seasonal hay-fever sufferer, who is often exquisitely sensitive to pollen, should also have symptoms at other times of the year. What seems to me to be a more probable explanation for these non-seasonal pollen asthma cases is that they are so poisoned during pollen season that their resistance is lowered for the remainder of the year; possibly during pollen season a disturbance of the colloidal balance of the blood occurs, which persists more or less throughout the year, unless corrected by specific pollen therapy.

Asthma Due to Miscellaneous Inhalants.

Under the head of miscellaneous inhalants, orris root easily stands first, because of its extensive use in face powders, sachets, tooth powders and hair shampoos.

Case 5. Miss E. H. Age 35 years. Perennial hay-fever and asthma of eight years' duration. Itching and redness of eyes, for which she used boric acid and argyrol. I might state that itching of the eyes is very significant of sensitization. Had never had a very severe attack without what appeared to be a cold, but was wheezy practically all of the time. Had noticed that face powder caused sneezing. Skin tests were made, and she gave a larger reaction to orris root than I have ever seen to any test. The flexor surface of her forearm was red, hot and swollen, extending nearly from the wrist to the elbow. She also gave a positive reaction to her own face powder. On substituting a powder which did not contain orris root all of her symptoms cleared up almost immediately. Had some slight trouble later, which she found to be due to a powder used by her room-mate. This was ten months ago, and she has had no recurrence.

Non-Sensitive Asthma.

Under non-sensitive asthma, are grouped all those patients who fail to react to any form of protein. It is my opinion that a considerable proportion of these so-called non-sensitive cases are also due to sensitization, and that we have merely failed to detect the offending substance. In justification, however, of the assumption that we have made a diagnosis by elimination, in these patients, of bacteria as the cause of their trouble, I might say that the majority of them can be relieved of asthma by proper autogenous vaccine therapy.

Case 6. Mrs. M. O. H. Age 43 years. First seen August 1, 1922. Severe asthma and bronchitis. Bronchial trouble started September, 1921, followed in February, 1922, by violent asthma. Believes she had several mild attacks of asthma preceding this date, unrecognized by her physician. Had never been susceptible to colds, and never troubled with a cough previous to September, 1921. Worse in cold weather, and on damp days. Sudden changes in temperature aggravated her trouble. Worse at night. During bad attacks could hear her wheeze all over house. Coughing preceded asthmatic attacks. Cough was very productive and sputum blood streaked at times. No itching of eyes. Her history, therefore, pointed very strongly towards germs as the cause of her asthma. On testing, found her negative to all proteins. An autogenous vaccine was prepared from her sputum containing streptococcus hemolyticus and viridans in the proportion of about 4 to 1, and she was given 100 million organisms as the first dose. Prostration set in shortly after this treatment, followed by a marked improvement in the asthma and bronchitis. I repeated the same dose, following which she was free of all symptoms of asthma and bronchitis. I then gave her 200 million, which dose was followed by petechiae on limbs, but no asthma or cough. This dose was repeated, with no reaction other than temporary prostration. Then 300 million was tried, and resulted in an extreme aggravation of her asthma and bronchitis. I saw her three times in one day and was forced to resort to hypodermics of adrenalin, morphine and atropine, and heroin for relief. Her family became alarmed at her condition and Dr. Sterling Ruffin was called in consultation. Because of her unpleasant reactions to vaccine treatment, a von Pirquet test was performed, which gave a positive twenty-four hour reaction. She told me at this time that quinine had always disagreed with her. A skin test with quinine sulphate gave a positive reaction, demonstrating the fact that sensitization may exist to non-protein substances. It was discovered that she had been taking a tonic containing quinine, which was of course discontinued. A couple of very small tuberculin treatments were then tried but with absolutely no effect on the asthma. In this connection, I might state that I have been unable to get the favorable results reported by Van Leeuwen and Varekamp in the tuberculin treatment of asthmatics giving a positive von Pirquet. Then treatment with the autogenous vaccine was tried again, starting with a smaller dose, *i. e.*, 50 million, and increasing it more cautiously than before. Ten treatments were given, the maximum being 300 million. Following the first of these treatments her cough and asthma disappeared and she has had no further trouble.

Have reported this case in considerable detail to meet the objection so frequently raised, that results in the vaccine treatment of asthma are always due to non-specific protein therapy. If this were true, it would seem that large doses would be more effective than small ones, but I have repeatedly found the reverse to be the case.

Hay-Fever.

Hay-fever may be perennial or seasonal in type. Perennial hay-fever has already been mentioned (cases 2 and 5). Seasonal hay-fever may be classified into early spring, late spring or summer, and fall types.

Early Spring Hay-Fever.

Early spring hay-fever is not very commonly met with, and is usually due to sensitization to tree pollens.

Case 7. Mrs. J. M. B. Age 48 years. Referred by Dr. Louis Greene. Early and late spring or summer hay-fever for past three years. Has been susceptible to roses all her life. Attacks started the last of April or first of May, reached their height about the middle of May, became milder in June and were usually over by July 4th. Attacks began with sneezing, which lasted one-half to three-quarters of an hour, then eyes would itch and water. Nose would stop up at night and she would wake in morning with headache and

sense of fullness in head. Eyes bothered her more than anything else, for which she had been taking local treatment. I first saw her May 18, 1922, at the height of her attack. On testing her I obtained a very marked reaction to hickory tree pollen and also quite a large reaction to rose pollen. Tests with grass pollens were all negative. She stated that she had a number of hickory trees on the place, one of which was right outside her bedroom window; and also that she spent considerable time in her rose garden. She was advised to sleep on the opposite side of the house away from the hickory tree and to stay out of the rose garden. I had a report a week later that she had no further trouble.

Roses are insect pollinated and do not cause symptoms except on intimate exposure even in sensitive patients.

Late Spring or Summer Hay-Fever.

Late spring or summer hay-fever is commonly spoken of as "rose cold," which is a misnomer, as most of these cases are due to sensitization to one or more of the grass pollens.

Case 8. Mrs. D. B. H. Age 29 years. Referred by Dr. Arthur Zinkhan. Had hay-fever almost as long as she could remember. Affected in April, May, June and first part of July. She reacted to all the grass pollens, her dominant reaction being to timothy. Believing that sufficient treatment with timothy alone would desensitize her against the entire grass group, she was given pre-seasonal treatment with timothy pollen extract. As a result, she went through the entire season without the slightest symptom of hay-fever.

Pre-seasonal treatment, started far enough in advance of season to get the patient as completely desensitized as possible just before pollination of the particular offending plant or plants, is undoubtedly the ideal method of treating seasonal hay-fever. In those cases in which preseasonal treatment is incomplete, or in which there has been no pre-seasonal treatment, co-seasonal treatment is well worthy of trial, as illustrated by the following case.

Case 9. Mr. M. L. Age 34 years. Late spring or summer hay-fever for past six years. Attacks started about May 10th, and lasted until middle of July. Perfectly well all the remainder of year. First seen May 12, 1922. His hay-fever had started the day before, and appeared to be a very severe attack. He reacted to all the grass pollens, his dominant reaction being to timothy. Rose was absolutely negative. Co-seasonal treatment with timothy pollen extract was started May 13th. After one week, during which three treatments were given, there was a marked improvement, and after three weeks' treatment his hay-fever disappeared and he remained entirely free for the remainder of the season.

Pre-seasonal treatment is given at weekly intervals unless the time is limited, in which case the interval between treatments may be lessened, especially on the smaller doses. Co-seasonal treatment, on the other hand, is preferably given at irregular intervals, depending upon the duration of relief following the individual treatment.

Fall Hay-Fever.

The typical fall hay-fever season is from about the middle of August until the first frost, which coincides with the period of pollination of ragweed, to which pollen practically all of these cases are dominantly sensitive.

Case 10. Mrs. J. V. Age 32 years. Fall hay-fever and asthma since 4 months of age. Attacks started between 15th and 20th of August and lasted until first frost. Free remainder of year. Asthma, which fortunately only occurred during hay-fever season, was so severe that she was unable to move, and was kept under morphine with a trained nurse in attendance. Had spent previous five seasons in Michigan and was practically, though not entirely, free there. Tonsillectomy, removal of nasal polypi, and cauterization of nasal mucous membrane had been tried, but with no relief. Had sinus trouble for past two winters. Patient stated that contact with daisies would cause hay-fever and peaches on the table made her feel uncomfortable. Cantaloupe or watermelon caused itching of throat. Unable to eat grapefruit as it caused severe urticaria. She reacted to short ragweed, giant ragweed, daisy and a few other members of the compositae; also to grapefruit, cantaloupe, watermelon and peaches. Her dominant reaction being to short ragweed, this was selected for pre-seasonal treatment. As a result of this treatment, which she put to a very severe test by driving around the country in an automobile, she went through the entire season, for the first time in her life, without a sneeze or a wheeze. She had one

day of slight prostration during season following the eating of peaches. This illustrates the advisability of making tests in these seasonal hay-fever patients with other than pollens, which are of course necessary, in order to detect any possible contributing factors.

What has been said under late spring or summer hay-fever in regard to pre-seasonal and co-seasonal treatment applies also to fall hay-fever.

Case 11. Mr. E. G. M. Age 39 years. Referred by Dr. Horrigan. Fall hay-fever of about five years' duration. Attacks started about August 20th, and lasted until frost. Well all the rest of year. I first saw him September 7, 1922, in the midst of his hay-fever, and a pitiful sight he was. His eyes were very much inflamed and itched intensely. There was profuse lacrimation; also sneezing and rhinorrhea. Some nights unable to sleep at all. Worse on dry days.

This attack had started August 17th, a little earlier than usual. He reacted to a number of fall pollens. His dominant reaction being to short ragweed, this was selected for co-seasonal treatment. The first treatment was given September 8th, and as a result he reported five days later that he was 90 per cent relieved. Two more treatments were given with equally gratifying results.

Eczema.

Eczema due to sensitization to one or more food proteins is very commonly met with, especially in infants and young children. Eczema or dermatitis, however, may also be due to contact of a sensitized skin with most any type of substance.

Case 12. J. J. R. Male. Age 47 years. Referred by Dr. H. H. Hazen. Eczema of thirteen weeks' duration. Started on front of neck. Patient thought it was due to shaving too close. Then spread to forehead and around mouth. Next it spread to arms, then legs, and finally body affected, especially around waist and back of shoulders. Had grown progressively worse in spite of various local applications, and X-ray treatments. Itching severe at times. Neck raw and bleeding. Legs swollen. Considerable pus formation. Food tests all negative. Tests were performed with great difficulty because of the condition of his skin. He had been wearing a long fur coat ever since the beginning of the skin trouble, so crude alcoholic extracts were prepared from fur clipped from the collar and lining of this coat, to which he reacted. On discarding the fur coat his skin cleared up.

Unfortunately he has since developed an erythema, which we feel is quite different from his former trouble. I might say that this erythema is clearing up very nicely following one X-ray treatment.

In closing, I would state that in reporting these cases selected from many other similar ones to illustrate some of the important phases of protein sensitization work, it is not meant to infer that all of the results are as satisfactory as these.

1726 *M Street, Northwest.*

FEVER.*

By WYNDHAM B. BLANTON, M. D., Richmond, Virginia.

There remain enough puzzling questions concerning temperature in health and disease, I believe, to make it still a subject of interest to us all. For instance, there is a well recognized diurnal fluctuation of temperature in man, which averages about one degree and is maximum in the afternoon. Nocturnal birds exhibit a similar fluctuation, but on the contrary their maximum rise is in the early morning. Why is it then that if man reverses his habits and works at night, he continues to have his maximum rise in the afternoon even though he be asleep? And what after all is the cause of the afternoon rise of temperature?

Heat Production and Heat Loss: The satisfactory understanding of fever or pyrexia implies the proper evaluation of the balance between these two factors. The creation of heat in the body arises chiefly from oxidation processes going on in the muscles, though other subsidiary oxidations add slightly to the heat produced. These oxidations include chemical changes in the glands during function, and the specific dynamic action of protein and carbohydrate digestion. In health, need for increased heat production is responded to by additional muscle work, such as shivering, increased muscle tone, or voluntary exercise.

In disease, increased heat production or fever is explained by Macleod[1] as the resultant of the effect of toxins on tissue increasing the osmotic pressure of their protoplasm. In consequence there is a flow of fluid from blood vessels to tissue followed by concentration of

*Read before Richmond Academy of Medicine and Surgery, April 24th, 1923.

the blood. (Such concentration can easily be demonstrated in fevers). Now with concentration of the blood there naturally follows a reduction of the blood upon the surface of the body. Contraction of surface vessels is the expected reaction to diminished blood flow or concentration. The conditions of a cold skin therefore obtain. The normal afferent impulses from an area of contracted vessels, or a cold skin, stimulate the heat center, which may in turn respond in one of two ways, either by increasing heat production or by diminishing heat loss. In either event a rise of the average body temperature is the result. Two other less inviting theories of heat production in fever find their adherents. One is the so-called neurogenic theory, which implies the integrity of nervous connections to and from the essential heat center; the other places the responsibility of febrile acceleration entirely on the liver and is based on comparative measurements of heat in the liver and muscles during pyrexia. In any explanation of heat production in the body, it seems to me highly improbable that there should be a different mechanism in health and disease. The heat of pyrexia must be produced in general as the normal body heat is, that is, in muscle oxidation. The stimulus may arise centrally, as in heat center punctures, or locally, as when increased heat production follows infections in cold blooded animals, or in warm blooded animals with high severed cords.

On the whole, heat loss is better understood than heat production. The elimination of heat in the body follows the well known laws of conduction, radiation and evaporation. The first two factors account for three times the loss due to evaporation. On the surface of the body almost the entire elimination of heat occurs. The cutaneous circulation under vasomotor control is a most important link in the mechanism for heat loss, as in this way the surface mobilization of heat bearing blood is effected, and it is at the surface of course that cooling occurs. The mechanism which controls this loss of heat is probably dependent upon the so-called heat center of the corpus striatum, which, in response to various afferent stimuli, increases heat elimination by the stimulation of sweat glands and vasodilators, and decreases heat elimination by the stimulation of vasconstrictors. Thus the cutaneous circulation of an extremity may be doubled by applying heat. The normal and natural stimulant, aside from afferent cutaneous impulses registering surface temperature is increased body temperature, as for example during exercise or in the pyrexia of disease. It has been shown that the simple flowing of the pyrexial blood through the cerebral circulation is sufficient to stimulate the heat center.

When all the factors are considered, heat storage seems to be the essential element of pyrexia. In other words the thermo-regulator has been turned up a notch or two. This is effected chiefly through conservation of heat. It is remarkable how little additional heat is produced in pyrexia, (20%), as compared to that formed during eating or exercise, (300%).

The Calorimeter has played an important role in the elucidation of the factors entering into the mechanism of heat production and heat elimination in the rise and fall of temperature. The most elaborate studies concerning this phase of fever have been carried on under the direction of Dr. DuBois, using the Russell Sage respiratory calorimeter. Typhoid fever, malaria, and tuberculosis have been the febrile diseases chiefly investigated. In all of them it has been shown that normal respiratory quotients obtain. It has likewise been shown that heat production during the febrile period is relatively small, being increased but forty per cent in typhoid and thirty per cent in tuberculosis. In the malarial chill the increase is from one hundred to two hundred per cent, due probably to shivering, with the accompanying muscular contractions. The exact mechanism has been most elaborately worked out during the several phases of this chill[2]. Here it has been shown that the skin temperature lags strikingly behind the rectal temperature until a considerable while after the chill. It has also been shown that heat production is but slightly increased prior to the chill. During the chill there is a marked increase. Subsequent to the chill, for a few minutes the increase continues to range between twenty and thirty-eight per cent. It then slowly decreases to normal. Heat loss remains normal throughout the period of the chill, is slightly increased immediately afterwards, but rises sharply during the period of the continuous high temperature and increases still further during the falling temperature. In typhoid fever, "a rising temperature was accompanied by an increasing heat production

which outweighed the increasing heat elimination. . . . . With a falling temperature the heat production remained fairly level while the elimination was increased."[3] In tuberculosis a rising temperature was characterized by increased heat production, a falling temperature by increased heat loss. The toxic destruction of protein with a negative nitrogen balance in typhoid fever may be counteracted by feeding fifty to one hundred per cent more than the normal protein requirement. In the case of tuberculosis this toxic destruction of protein has been shown to be smaller than in typhoid and the habit of overfeeding, especially of protein, has been remarked upon as possibly dangerous in that the accompanying elevation of metabolism throws more work upon pulmonary function.

Clinical Thermometry: Astonishing is the regularity with which physicians employ thermometers and the ubiquitousness of the hospital temperature chart argues for widespread faith in such data. The use of any exact instrument, such as the mercury thermometer, often leads us astray into believing that we thereby gain exact information. And so we lay great stress upon temperature variations, reading and charting tenths of degrees. As a matter of fact clinical thermometry as ordinarily practiced, be the thermometer ever so exact, is often very misleading. This is simply because we assume that the thermometer reading represents the body temperature when as a matter of fact it registers only local temperature. The temperature of the mouth is different from the temperature of the axilla and the temperature of the rectum, and no one of these represents the temperature of the body. In estimating the heating efficiency of a house furnace, to test only the temperature of one room affords no information at all concerning the other rooms. Now not only does the temperature of the mouth, axilla and rectum vary under normal conditions, but the temperature of the mouth itself varies in health in response to a number of factors. The circulation and vasomotor control are extremely important in determining these local variations, which as we have said, in no way affect the temperature elsewhere in the body. Cold hands and cold feet may accompany a rising temperature. Heat elimination may be the same over a warm skin as over a cold skin, depending entirely upon the level of blood cooling. If there is vasomotor dilatation and surface cooling there is warmth of the skin. If the blood is cooled in the deeper layers of the skin, the skin is cool.

Strictly speaking we are seeking for the average body temperature in practicing clinical thermometry. As a matter of fact what we obtain is only local body temperature. The average body temperature represents a calculation based upon the height and weight of the individual and the difference between heat production and heat loss over a definite length of time. This is of course too difficult a procedure for routine use and is unnecessary except in careful investigations. As a usual thing the clinical thermometer affords useful and approximate informaiton. It does not give us average body temperature, and if the factors of local variation are carefully considered and eliminated, mouth temperature, for example, should in general parallel, though not exactly equal, the average body temperature. I do not wish to disparage the use of the clinical thermometer, but to emphasize care and conservatism in the interpretation of slight temperature variations from the normal.

Fever in Diagnosis: Armed with all the available knowledge concerning the physiology and pathology of pyrexia, we are often at a loss in the interpretation of temperature elevations. We may actually fail to recognize the presence of pyrexia, as for example when a patient is repeatedly examined in the morning and shows a temperature rise only in the afternoon: or when a subject of intermittent temperature is seen on the afebrile days. Or on the other hand, we may be puzzled by elevated temperature in the apparently healthy, discovered in examinations for military service or insurance. This type of temperature rise is familiar to hospitals under the name of "Sunday temperature." It is probably purely a nervous phenomenon exhibited by patients entering a hospital, coming to a doctor's office, or seeing visitors. In the nervously unstable one occasionally encounters temperatures of 100° to 102° accompanied by corresponding accelerations of the pulse. That these rises are nervous in origin is evident from the fact that if such persons are made to recline from ten to fifteen minutes in a quiet room the temperature quickly returns to normal with the slowing of the pulse. So common in this elevation of temperature in nervous young women

observed to follow the excitement of physical examination that the practice should be followed of securing all constitutional signs before the history or examination is undertaken. The physiological explanation of these cases probably lies in the instability of a center which allows of vasomotor constriction with diminished heat loss. There must then arise afferent stimuli from a cold skin accelerating heat production. The effect of psychic influences in these persons is obvious also from their cold clammy skin.

Martinet,[4] for clinical consideration, divides pyrexias into those of short and long duration, and the intermittent fevers. The real cause of the majority of fevers of short duration is probably never discovered, even taking into consideration the exanthemata, respiratory and gastro-intestinal infections. In children, for example, the two or three day temperature flare-ups accompanied by no very definite concomitant findings, with all due respect to the pediatrician, make his diagnosis little better than guess work. Probably in the summer time he brands most of his cases gastro-intestinal and in the winter respiratory, but the febrile child in summer will often tax the imagination to find anything wrong with his stools, and the febrile child in winter may have neither red throat nor cough. Similarly with adults. An honest analysis of our short febrile cases will show us at best to be flounderers in the dark, willing to catch at any straw. Thus every winter temperature of short duration practically becomes a case of that awful disease known to the public as "Flu." I do not think there is any doubt of the fact that we know little of the causation of many of the short lived pyrexias, by whatever name we choose to brand them, and fortunately, the storm has come and gone while we are still choosing among our brands.

When we approach the fevers of long duration there should be and probably is more accuracy in diagnosis, because we have more time to make observations, and the chances of more striking physical findings are greater. Cabot[5] from hospital statistics states that typhoid fever, sepsis and tuberculosis embrace 90 per cent of long continued fevers. Martinet[4] puts tuberculosis at the head of the list, emphasizing the importance of latent tubercle infection of the lungs and kidneys, and maintaining that ninety-eight per cent of long continued fevers fall into a category headed by tuberculosis and including sepsis, (that is, endocarditis and pus anywhere, obvious or occult, such as the appendix, gall bladder, genito-urinary, gastro-intestinal tracts, pleura, lungs or lymph glands,) influenza, rheumatism, typhoid and paratyphoid infections. The remaining two per cent include occasional causes such as meningitis, malaria, leukemia, neoplasms, Hodgkin's disease, atropine poisoning, and thyrotoxicosis.

I believe that the average case of obscure pyrexia of long standing will be elucidated by following the usual leads of a careful history and the physical findings, but this is not always the case, and the advantage of having in mind such a classification as that of Martinet[4] is frequently illustrated, as for example in a case of carcinoma of the stomach. The patient, a middle aged man, presented himself with an afternoon temperature of 100 to 101 degrees, complaining of weakness, and with the associated findings of leucocytosis, and anemia, and the signs of myocardial disease. Attention was focused on his temperature, the cause of which baffled investigation for more than two months. Then the search was enlarged to include all possible causes of pyrexia. There were no leads pointing to the stomach until the sudden onset of vomiting. Gastric analysis, stool analysis, and X-ray of the stomach were now done, and immediately established the diagnosis of carcinoma of the stomach. On the other hand, a well nourished woman of thirty-three complained of headache and fleeting pains throughout the body. She had a moderate leucocytosis. Her temperature ranged however from 103 to 100 degrees for more than two months without revealing a satisfactory cause. The history, physical and laboratory findings, including urine, blood, Widal, stool and X-ray of head and chest, were disappointingly negative. The usual string of specialists explored their respective fields. An exploratory laparotomy was likewise barren of results, and the elevated temperature continued. She returned home, dismissed her doctors and in a few weeks was temperature free. Nor did she nor anyone else know how it happened.

The Purposefulness of Pyrexia: Both experimental and clinical experience point I believe to the usefulness of pyrexia especially in infections. Pyrexia itself, except in heat stroke, where there is probably some other ad-

ditional factor operative, is rarely injurious to the individual. Naunyn, as pointed out by Ringer[6], demonstrated that animals could be maintained for long periods of time at febrile temperatures without showing any injurious effects. Rolly and Meltzer[7] years ago showed the actual beneficial effect of hyperthermia upon animals in resisting infections. Animals which were kept at a temperature of about 40 degrees Centigrade, when injected with cultures of pyogenic organisms, showed a fifty per cent mortality, whereas all control animals, whose temperature was not raised, uniformly died after similar injections. It seems fairly certain that fever serves the useful function of assisting in the body's reaction to infection. In spite of the fact that bacteria in the test tube show fairly definite optimum temperatures for growth, in the body the temperature never rises sufficiently to inhibit seriously their growth *per se*. The effect of pyrexia seems to be entirely in favor of raising immunity. Ringer cites a table showing the very definite effect of elevations of temperature upon the phagocytic function of the leucocytes. Rolly and Meltzer also showed that bacteriolytic substances as well as agglutinins were elaborated in far greater quantities and much more rapidly in pyrexial animals than in controls. In this connection MacCallum[8] says that fever is in a way analogous to the vascular reaction in inflammation in that it is the process which facilitates the more essential activities of the phagocytes and the production of defensive chemical substances in the body.

The Treatment of Pyrexia: The proof seems fairly certain that pyrexia is purposeful, that the processes of resistance to infection go on more vigorously and effectively in the human body in the presence of an elevation of its temperature. In view of the fact that during exercise heat production may exceed by ten times the heat production of fever, which probably averages about twenty-five per cent plus, there is little harm to be expected from the actual excessive heat production. Heat storage, however, due to failure in heat elimination, may or may not be injurious. Meara[9] believes that temperatures that do not exceed 104 degrees do not need treatment *per se*. Hyperpyrexia which may be taken to represent temperatures above this figure demand the usual treatment exemplified in the cold bath for sunstroke. Meara[9] goes on to point out that hydrotherapy in febrile conditions, such as typhoid fever, is not directed primarily at hyperthermia, but is useful for its influence in increasing elimination through the skin and for its reflex influence upon blood pressure and its steadying effect upon the heart and respiratory centers. On the same score the use of drugs, particularly the coal tar products, should be condemned. Whether they reduce temperature by increasing heat loss (as the coal tars), or by sweating (as aconite), or by vasodilation (as whiskey), or by lessening heat production (as quinine), we are in the end interfering with a purposeful reaction and our therapy is meddlesome.

The protein shock gotten by intravenous injection of dead bacteria, advocated by Snyder[10] and others in the treatment of chronic arthritis, is thought to depend for its effect upon the chill and accompanying high fever.

The hyperpyrexia of thermic fever or heat stroke is no doubt injurious. Temperatures of 104° to 114° accompanied by coma and convulsions are certainly associated with cerebral and visceral injury.[11] This is borne out at autopsy in such findings as cerebral edema and hemorrhage with cloudy swelling of the liver, heart and kidneys. The fact that it appears that the fatal cases show high urea and creatinin retention in the blood bespeaks some other antecedent factor in those who die, especially when the age incidence and alcoholic history are taken into consideration.[12]

Aside from hyperpyrexia there appear to be two possible sources of harm from elevations of body temperature. The negative nitrogen balance which often accompanies pyrexia is taken to indicate a specific destruction of protein. Sufficient feeding, especially of carbohydrates, as has been shown, will spare the body protein. Acidosis may also follow fever, due likewise to deficient carbohydrate intake and the consequent hurried and incomplete combustion of fat. Sufficient allowance of starches and sugars in the diet will ward off this complication. That leaders in the profession have appreciated the dietetic demands of pyrexia is shown in the request of Robert Graves nearly a century ago that his tombstone bear only the inscription, "He Fed Fevers."

300 *West Grace Street.*

BIBLIOGRAPHY.

1. Macleod. Physiology and Biochemistry in Modern Medicine. IV. Edition. 1922. Page 752.

2 Clinical Calorimetry. Paper 28. Metabolism in Malarial Fever. D. P. Barr and E. F. Dubois. Archives of Medical Research. May, 1918. Volume XXI. Pages 627-658.
3. Clinical Calorimetry. 7th Paper. Calorimetric Observations on the Metabolism of Typhoid Patients with and without Food. Archives of Int. Med. May, 1915. Volume XX. Part 11. Pages 887-938.
4. A. Martinet. Clinical Diagnosis and Symptoms. Volume II. 1922.
5. Cabot, Hugh. Physical Diagnosis. V. Edition. 1912.
6. Ringer, A. I. Amer. Jour. Med. Sc. Vol. 142. 1911. Page 485.
7. Rolly & Meltzer. Deutsch Arch. fur. klin. med. 1908. Volume XCIV. Page 335.
8. MacCallum, W. C. Textbook of Pathology. 1916.
9. Meara, Frank. The Treatment of Acute Infectious Diseases. 1916.
10. Snyder, R. G. A Clinical Report of Non-Specific Protein Therapy in the Treatment of Arthritis. Arch. Int. Med. Volume 22. 1918. Page 224.
11. H. Gauss and K. A. Mayer. Amer. Jour. Med. Sc. CLIV. 1917. Page 554.
12. R. B. H. Gradwohl and E. Schlisher. Amer. Jour. Med. Sc. Volume CLIV. 1917. Page 407.

A DISCUSSION OF SOME PHASES OF MENTAL DISEASES.*

By JESSE A. STRICKLAND, M. D., Norfolk, Va.

In discussing the subject of mental disturbances, I realize that I have nothing new to bring forth. My object is simply to freshen your memory with some phases of the general subject, and try to show that because an individual is insane, it does not necessarily follow that he should be given over to the care of an attendant, and lost sight of by the medical man. The insane are no longer looked upon as the inspired instruments of the Deity. Insanity implies disease, either of the whole organism or of some special part. There are usually no demonstrable changes in the brain or its appendages and the mental symptoms may be due to exhaustion from some visceral disease, or from poisons circulating in the blood stream. That the brain can be influenced by poisons without any microscopic changes is definitely proven by the action of certain drugs, such as alcohol, hyoscine preparations, patent medicines, paraldehyde, and so on.

In this connection it is well to recall that alcohol depresses the motor activity of the brain and, in the acute stages of alcoholism, sets up an ataxia, or may produce a complete toxemia, which manifests itself in delirium, tremors, hallucinations and delusions, both auditory and visual. Pathological studies have shown that prolonged use of alcohol may result in degenerative changes in the cortical cells, bringing about a mental state known as alcoholic dementia. Of the other drugs that play a part in mental upsets, hyoscine is depressive, causing delirium and disturbance of all the coordinated movements, delusions and hallucinatory experiences; patent medicines act usually by absorption of poison; while paraldehyde results in a temporary upset.

From the mental disturbances which can be traced from such obvious causes, we come to the limitless line of investigation that bears in its train the manifold phenomena that produce the psychoneuroses. In following it, we often touch upon the field of the unknown.

Just how far actual foci of infection enter into the etiology of the psychoneuroses, we are not able to say, but I am of the opinion that a focus of infection in one whose nervous system is already unstable may play a major part in their development. While searching for such a cause, we should not omit a careful examination of the prostate, as this organ may frequently be the seat of a specific or non-specific infection. I recently saw a case of psychoneurosis in a man with infected tonsils, who showed some improvement following tonsillectomy, but whose condition did not finally clear up until a urologist discovered and treated a chronically infected prostate. I might say here that proctitis, or an ulcerated rectum, although rare, may be a source of infection, causing rheumatism and also a mental or nervous state as mentioned above.

Of the infectious diseases, epidemic influenza is probably most prone to be complicated by psychic disturbances. The mental upsets are more frequently seen in persons over twenty years of age, affecting women more often than men. There seems to be a neuropathic or psychopathic predisposition in all forms of psychosis encountered here: most frequently noted in those cases where the psychosis did not become apparent until after the febrile stage of the disease. As a rule, the more serious the influenza, the more severe the psychosis. It is generally agreed that there is no specific influenza psychosis but an unstable mentality may be aggravated by the disease. Menninger[1] has said that the significance of the influenzal psychoses is in their relationship to dementia praecox. Postfebrile delirium and dementia praecox were by far the most numerous sequelae of influenza.

In like manner we find that we do not

*Read before the Seaboard Medical Association, at Newbern, N. C., December 7, 1922.

definitely know just what the pathology of the brain in pellagra has to do with the mental state, which is evidenced by hallucinations and delusions. Here there is very probably permanent destruction of the brain cells. Many patients apparently recover from the initial attack, only to have a recurrence the following year, but some, after one attack, recover completely and never have another.

Advancing from the field of mental disturbances coincident with non-specific infection, we reach those conditions which may be termed functional diseases of the brain, such as epilepsy, dementia praecox and manic depressive psychosis.

The mental condition of an epileptic depends upon the type of continual attacks of the disease, whether petit mal, or grand mal. In many cases of attacks of petit mal occurring in children, the patients have been of low mentality previous to the attacks or even from birth. Just recently I saw a child nine years old, who demonstrated the disease by three or four sharp snaps or jerks of the head. This child did not progress in school, even in the simplest forms of kindergarten work. The Binet-Sinon test showed her to be an imbecile. X-ray findings demonstrated a pathological sella turcica. Adults with epilepsy are suspicious, irritable and forgetful, repeating their acts without reason, and forgetting to perform the daily task set for them. Just how much degeneration we have of the cortical cells, or what brings it about, we cannot say. We do know that the attack causes a swelling of the brain tissue and an increase of fluid in the ventricles. I have a young woman under my care who was very bright as a girl, and whether a head injury following a fall from her horse was the cause of her initial convulsion, or whether she had a convulsion and fell from her horse in consequence, I cannot say. I do believe, however, that in many cases the attack is the cause of the accident, rather than the accident being the cause of the disease.

Manic depressive psychosis, as its name implies, consists of two separate conditions: an acute maniacal stage and a depressed phase. According to Kreplin's classification, manic depressive psychosis includes mania, melancholia, circular insanity, and recurrent insanity. There is another type which has been described, in which the patients are mildly depressed. I refer to cyclothymia. These are the cases that are first seen by the general practitioner, and many are handled very successfully by him. I am convinced that in some way the glands of internal secretion are associated with many types of manic depressive psychosis. Tucker, several years ago, reported a number of cases of pituitary psychosis, which did not differ materially from the manic depressive form. A thyrotoxicosis, or hyperthyroidism, may in like manner be the cause of definite maniacal or depressive attacks. A manic depressive tendency can often be traced from youth in members of psychopathic families. The young man or woman who frequently has the blues over trivial situations, and who is just as easily elevated, is a potential case of manic depressive psychosis.

I have a case of a young woman, twenty-six years of age, a tailoress by trade, who in 1918, after periods of severe headache, for which she sometimes took as many as 20-30 grains of aspirin a day, became very much concerned about a friend who was on the Cyclops, the collier that was lost at sea. His fate preyed on her mind to such an extent that she resorted to the Ouija board for help. Her translations from the board proving unsatisfactory, she passed from this state into that of a raving maniac, talking to the Kaiser, blaming him for the destruction of the ship and the loss of her friend, and claiming that the Kaiser held him in captivity in Germany. Her emotions were demonstrated by violent temper, cursing, and various forms of auditory hallucinations, such as conversing with the Deity and He with her, in regard to the boy's release. This condition persisted for days, the girl being kept quiet only by sedatives, hot packs and the continuous bath. After a period of a few weeks she cleared up well enough to leave the institution, and has had no apparent trouble since; although in talking to her, one notices that she is somewhat elevated.

In contrast to this case, is the following: Mrs. B., age 42, supposedly at the climacteric period, the wife of a coast guard, saw a ship explode and burn near shore, and feared for the safety of her husband, who among others, went to the rescue of the crew. She became greatly depressed after this experience. The depression increased, she became suicidal, and finally refused to take food, which necessitated tube feeding. Her mental and physical inertia was so marked, and her resistance so lowered,

that she developed pneumonia and died within a few weeks after the time of her upset.

In speaking of mental diseases that may be traced from childhood, one naturally thinks first of dementia praecox, since, as its name implies, it is a dementia of the young, occurring about the adolescent period, relatively earlier in girls than in boys. I am not going into its various classifications, except to say that the catatonic type, in my experience, seems more apt to clear up. That is to say, it seems to pass from an acute to a chonic stage. There are cases, however, where a boy or girl has seemed to be bright or even precocious up to the age of puberty, and then, like lightning from a clear sky, develops a sudden upset which we diagnose as dementia praecox. What causes dementia praecox, we are unable to say. Mott,[2] in his investigations, claims that in a large proportion of dementia praecox, there is complete arrest of spermatogenesis and a more or less regressive atrophy is shown, the degree of changes depending upon the age at which the mental symptoms were first manifested, and the time elapsing between the onset and death. In some cases, spermatogenesis may never have occurred. Mott points out that "Active nuclear proliferation is going on, necessitating an abundant nucleic acid formation, which acid is the main constituent of the heads of the spermatozoa. The failure of nuclear activity in the testicle in dementia praecox is very important in view of Nissl's and Alzheimer's demonstration that the essential histologic change in the nerve cells in this disease is one of nuclear decay. "The critical dementia praecox period of life is adolescence, when the sexual function matures. This affords evidence of the important relation between the sexual function and disease of the mind." The question then arises, is a regressive atrophy of the reproductive organs the cause of mental changes, first by its disturbing influence on the whole endocrine system: second, by the suppression of normal sexual impulse; or third, is it evidence of an inherent lack of vital energy, germinal in origin? At what period this nuclear decay begins, it is difficult to say. It may start before puberty, or later in life. So long as the boy does the work of a boy, he is all right, but when confronted with life's more serious side, with its many ups and downs, he develops a complex and reacts by a mental upset.

People suffering from this type of mental disturbance constitute a large proportion of the patients in insane asylums today. Such individuals, as a rule, go from bad to worse. We may have a patient who gives the history as a school-boy of being "queer" and apathetic, and who may or may not do well in his studies, depending upon the amount of work he is asked to do. This boy suddenly decides that he wants to stop school and go into business for himself, but, in trying to concentrate on any one line, he finds it impossible to focus his attention, and vacillates back and forth through half a dozen forms of industry, usually complaining that his associates "have it in for him" and are not "giving him a square deal," either from a social or financial standpoint. I recently had a young man under my care who presented the above picture. He went into the brokerage business with his brother-in-law, suddenly made up his mind that his partner was cheating him, and proposed to sell out. The boy went to South Carolina, wishing to get away from destructive outside interest and strike out for himself. At this time his mental upset had developed to such an extent that he claimed people were following him, watching and criticizing his every movement. He said that the police of Charleston had been notified of his arrival and, although he did go into the cigar business, he lasted only a very few days, because "they watched him so closely they ruined his business." As a matter of fact he was in the throes of a complete upset, and fell into a state of amnesia of about two weeks' duration, during which time he was brought to Norfolk. After a few weeks of institutional treatment he cleared up sufficiently to go home under family care, where he spent his time trying to write poetry and songs. He has had remissions, one after another up to the present time. This boy had been in the Army and was sent overseas, but was never able to go to the front or take part in the war activities. Just how far the army life furthered his wretched condition, I am unable to say.

When we consider the types of disease that are conducive to mental unbalance, we first recognize the necessity of proving or disproving the presence of brain syphilis, especially paresis. There is a difference of opinion as to how soon after infection, mental disturbances arise from paresis. Some writers claim that

they may appear as early as the second or third month after the appearance of the initial lesion. Naunyn, in a study of 335 cases, reported forty-eight per cent. developed signs of cerebral syphilis within three years after infection. On the other hand, forty years have been known to elapse before cerebral symptoms manifest themselves. In the two cases I have to report, there were intervals of eleven and twenty years respectively between infection and manifestations of mental disturbance, but in this regard, it must be remembered that these statistics are not necessarily authentic, depending as they do on the word of a paretic after his condition began to improve.

The mental state of a paretic, while apt to be despondent, may, on the other hand, show marked excitement, as in the two cases I have to report. The first case was that of a white man of 46, a dairyman by trade, who came to me in January, 1921. He was a poorly nourished, greatly emaciated individual, weighing only 94 pounds. His family history gave no evidence of tuberculosis nor any serious mental disturbance. There had been one child who was a moron. Neurological examination of this man disclosed the following symptoms. All deep reflexes exaggerated, pupils fixed; no Babinski; no clonus; slight Romberg. Mentally, he was confused, talking constantly but disoriented as to time, place and persons, had delusions of grandeur and was under the impression that he was actively engaged in trading horses and catttle. His mental trouble was said to have started three weeks before I saw him. He later admitted an initial lesion 20 years earlier. Laboratory findings showed a four plus Wassermann of both blood and spinal fluid, and 20 cells in the fluid. Treatment, which was instituted at once, consisted of six intravenous injections of neo-salvarsan with complete drainage of the canal, coupled with mercury inunctions, and mixed treatment by mouth. His mental state became clearer and his physical condition improved so much that in March he weighed 115 lbs. I did not see him again until July, when he returned for another series of neo-salvarsan injections, with drainage, and two Swift-Ellis treatments with mercury and iodide as above. At this time his spinal fluid Wassermann was four plus and that of his blood two plus. He then weighed 139 pounds, and his whole condition showed marked improvement. The point in this case, however, which I wish to emhasize, is this: Although the man received repeated intensive treatments, and noted marked improvement, physically and mentally, his Wassermann reaction never fell below four plus in the fluid and two plus in the blood, as long as I had him under observation.

The second case was a white man, formerly night clerk and cashier of a hotel, who came to me in November, 1921, complaining of headache, forgetfulness and cough. He had formerly consulted an internist on the suspicion that he had tuberculosis. This man admitted having had a sore mouth sometime between 1908 and 1910, and one dose of 606 at that time. Examination showed fixed pupils, absent deep reflexes, positive Romberg, 40 cells in his spinal fluid, and four plus Wassermann of both blood and fluid. Mentally he was disoriented, had delusions of grandeur, thought the house was burning up, and was generally excited. A diagnosis of tabo-paresis was made.

This man received six intravenous injections of neo-salvarsan with drainage, mercury inunctions and mixed treatment by mouth. Two months later he was greatly improved, even to his reflexes. He refused to sumbit to further Wassermann tests but, after three more months, with no other treatment, he returned to his work at the hotel.

There is a difference of opinion as to the efficacy of anti-syphilitic treatment in paresis. One view holds that a meningitic or perivascular infiltration can be reduced, and the spirochete killed, with cessation of toxin formation and inhibition of degenerative changes. (Solomon,[3] etc.) Noguchi and Moore,[4] on the other hand, claim that the spirochetes probably linger in the deep tissue of the cortex, and that anti-syphilitic drugs are prevented by a filtering process from reaching the central nervous system, thus failing to accomplish any therapeutic effect.

On such evidence as we have, some men refuse to treat general paralysis of the insane. But in this, as in any case of human disability, I take the stand that we have nothing to lose and all to gain, as in the cases just discussed, in which I feel that while they may and doubtless will have remissions, I have

been, from a humanitarian standpoint, amply repaid.

310 *Taylor Building.*

REFERENCES

(1) Menninger, K. A., Jour. A. M. A. 1920, 75, 16, 1044.
(2) Mott, Sir. F. W., Proc. Roy. Med. Soc., Sec. on Psychiat. Nov. 11, 1919.
(3) Solomon, H. C. and Taft, A. E., Effects of Anti-Syphilitic Therapy as Indicated by the Histological Study of the Cerebral Cortex in Cases of General Paresis. Arch. Neur. & Psych. Oct. 1922, VIII, No. 4, P. 341.
(4) Noguchi, Hideyo, and Moore, A Demonstration of Treponema Pallidum in the Brain in Cases of General Paresis. Jour. Exper. Med., 1913, 232. Jour. A. M. A., July 12, 1913, 85.

PHYSICAL EXAMINATION OF THE LUNGS IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By DEAN B. COLE, M. D., Richmond, Virginia.

The patient should be made to feel at ease as far as possible, stripped to the waist and allowed to sit on stool (or straight chair if stool is not available), facing window so light will fall over examiner's shoulders. The physician should also be seated on a stool (if another is available), otherwise on straight chair and should make himself as comfortable as possible. Comfort for both patient and physician is essential. For this reason the examining room should be comfortably warm or cool as the case may be, and as free from noise as possible. Now have patient drop shoulders slightly forward with good muscular relaxation and you are ready to proceed with the examination.

The four means of physical examination of the lungs are inspection; palpation; percussion; and auscultation. These will be considered in the order named.

INSPECTION comes next to auscultation in importance and not infrequently is inspection the most important factor in making a correct diagnosis. Almost at a glance the following facts may be noted: whether patient looks well or ill; is he nervous and excited; is face flushed or does he look pale and anemic; is he well nourished or is he emaciated; is muscular development good or poor—do not confuse muscular development with whether or not a patient is well or poorly nourished for he may have both good muscular development and good nutrition, or either or neither. Notice patient's build, whether robust or not; type of chest, whether broad, flat, funnel, chicken, long and narrow, barrel, or any combination of these; also type of breathing, whether thoracic, abdominal, or mixed.

After having made a mental or physical note of the above, note patient's chest expansion, whether or not expansion is diminished; if so this would suggest an old tuberculous lesion, or pleural adhesion, or some other mechanical restriction. It may be a relative thing, as in an acute pleurisy or pleurisy with effusion, where the opposite lung is compensating.

Note any lagging, always remembering that this is suggestive of a more acute condition than fibrosis or pleural adhesions. It is frequently advisable to stand up and look down on the patient, using a blue pencil for marking symmetrical points for comparison. At any rate never forget that patient has both a front and back. The scapulae are excellent land marks for comparison. Make note of any prominences, depressions, retractions, or scoliosis. Also any pulsations, whether normal or abnormal. It is well to always look for apex beat of the heart, for I have known more than one physician to treat a patient for months without discovering that the heart was to the right of the sternum. Observe the condition of the skin, whether moist or dry, profuse sweating, etc. Examine fingers for clubbing, remembering clubbed fingers are suggestive of some chest condition but not necessarily tuberculosis.

PALPATION is used primarily to confirm inspection as to lagging and diminished expansion. This is best done by placing patient against wall, using rather firm pressure with both hands palpating homologous areas. Palpation is also of use in differential diagnosis. In the presence of consolidation, fibrosis, or cavity, one would expect to find vocal fremitus increased. Pleural effusion, thickened pleura, or pneumothorax usually cause a diminution of vocal fremitus. Remember to palpate homologous areas, using light touch, and have patient to say "nine, nine" aloud. Pottenger lays especial emphasis on palpation in determining muscular rigidity or spasm, muscular atrophy, skin tension, and presence or absence of subcutaneous fat. This is of unquestionable value.

PERCUSSION. I will not go into the physics of percussion more than to say its value is

*One of a series of lectures and demonstrations to a class of physicians in the diagnosis of tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

based on the fact that sound is produced when an elastic body is made to vibrate by striking. This sound varies from tympany (best gotten over stomach or intestines partially filled with gas) to flatness which is heard when arm or leg is percussed. Between the two extremes of tympany and flatness we have hyper-resonance, resonance, and dulness. Tympany may be gotten over a pneumothorax, a large cavity, or even over deep consolidation, if sufficient normal or partially collapsed lung overlies it.

Hyper-resonance. Compensating lungs and emphysematous lungs frequently give a hyper-resonant note.

Resonance is best elicited high in axillary spaces.

Dulness, decreased resonance, etc., may be produced by anything impairing the lung elasticity, from pneumonic consolidation to slight tuberculous infiltration.

Flatness is most often encountered in pleural effusions.

Remember in percussing chest to have only one finger in apposition to chest wall, use fairly firm pressure, a light stroke delivered from wrist, and compare homologous areas. I prefer to percuss from base upward, but that is a matter largely of preference.

Auscultation is the most important method we have at our disposal for physicial diagnosis of lung disease. Not infrequently does our stethoscope show us how little we gain from inspection, palpation, and percussion. As to stethoscope, I think the Ford is the usual preference. At any rate, ear pieces should fit the ears with comfort, and at the same time exclude outside noise; the tubes should be heavy enough and short enough to avoid kinking, and the bell should fit firmly so as not to make any noise in moving. As a general statement, I would say the simpler the stethoscope, the better.

In auscultating the chest, have patient breathe quietly with mouth open and a little more rapidly than normal. Now listen in both axillary spaces to get the normal vesicular breathing for this particular patient, but be sure patient is breathing properly. Now listen over anterior surface of chest (I prefer to begin at base and go up) for any breath changes, remembering that broncho-vesicular breathing occurs normally above and inside a circular line from middle of clavicles through second chondrosternal junction, more marked on right than on left side. Turn patient around and examine back in same way. Broncho-vesicular breathing is normal at extreme apices and between scapulae near spine, also at left base below angle of the scapula. Remember that broncho-vesicular breathing is characterized by prolonged high pitched expiration and is not normally found outside of areas just mentioned. Abnormal broncho-vesicular breathing leads one to suspect pathology and to think of fibrosis due to tuberculosis as the cause, as this is the most frequent cause.

Be on the alert for suppressed breathing as this is frequently one of the first signs of a developing tuberculosis. After studying the breath sounds, have patient to whisper "one, two," gently during expiratory phase of breathing. Normally the whisper can be heard over about the same areas as normal broncho-vesicular breathing but not elsewhere, except on spine which we will not consider here. This should confirm findings as to the presence or absence of breath changes and frequently is a more delicate means of determining slight variations from the normal.

Now examine for rales in same way but have patient to breathe out gently and cough. He will naturally breathe in if you will make him breathe out and cough at rate of thirty times a minute. Forget everything but rales and listen for them. If present, try to determine their comparative size and their wetness; whether or not they occur in showers; and if more than one kind of rale is present. Also determine if they are superficial or deep, or both, and in just what phase of respiration do they occur, remembering that they may occur at beginning of inspiration, or throughout inspiration; or with or just after cough; or they may occur at any time, apparently at their convenience. One's understanding of rales and accompanying breath changes determines to a great extent his ability to diagnose and prognose tuberculosis. By a careful study of the physical signs can be determined to a great extent the age and extent of the lesion, whether or not it is spreading or has recently spread, and in general, the outlook for the patient. The physical findings, history, symptoms, laboratory findings, and X-ray must all be considered together and correlated finally, but each should be studied individually as if

there were no other evidence.

Before taking up rales I want to mention some of the adventitious sounds that the examiner must be on the lookout for:

(1) Muscle crackles;
(2) Sternal crepitations;
(3) Sterno-costal crepitations;
(4) Skin crackles;
(5) Atelectatic rales.

These are all heard at apex of lung.

The first four can be differentiated by having patient hold breath, and moving part in question. *Atelectatic* rales will disappear after three or four deep breaths. *Marginal* rales are heard at base, near margin of lungs, and they are, as a rule, coarse and dry and disappear after patient breathes deeply a few times. They are of no importance. Pleural sounds, rales, or rubs may vary from inspiratory rales to a to-and-fro breathing rub. Unless a pleurisy is well defined it may be difficult to diagnose. Clicks cannot be described better than the term itself. They may occur in any part of the chest at any time and are generally of no significance.

Rales

There are many classifications of rales. Personally, I prefer the one used by Colonel Bushnell, which is about as follows:

Crepitant and subcrepitant: Occur in showers in inspiration, and inspiration only. Found in acute inflammations as pneumonia, or a recent extension of a tuberculous process, which pathologically is a pneumonic process. (The atelectatic rale, and rale of an almost healed lesion, is a fine rale, and frequently has many of the characteristics of crepitant and subcrepitant rales.)

Indeterminate Rales: The indeterminate rale occurs at any phase of respiration or may occur throughout respiration and cough; may sound superficial, or deep, or both. It has no regard for time or place.

Small and medium moist. Most often heard in tuberculosis. Always denote chronicity.

Large moist. Frequently heard in last stages of tuberculosis or beginning cavity formation. Also heard in edema of lungs and sometimes in bronchitis.

Bubbling or Gurgling Rales: Usually heard in cavity formation. May be produced in large bronchi. If caused by tuberculosis, never found in earlier stages of the disease.

Sibilant and Sonorous Rales: Rales of bronchitis. These rales may be musical or noisy and usually it is impossible to diagnose or rule out tuberculosis when these rales are present.

Metallic tinkle, succussion splash, etc., do not occur in uncomplicated pulmonary tuberculosis, so will not be considered here.

For diagnosis of pulmonary tuberculosis on physical findings *alone* the signs *must* be in the upper half of the chest. Tuberculosis *usually* invades the upper portion of the lungs and not the lower. However, if the lesion is basal, tuberculosis should be ruled out or diagnosed by means of history and symptoms or by the X-ray or the microscope.

For a *definite* diagnosis of tuberculosis one or more of the following should be present:

(1) Tubercle bacilli in sputum.

(2) Small or medium moist rales (called by many moderately coarse) in upper half of chest. Diagnosis may be made on finding subcrepitant or sometimes other rales with breath changes, but here history, symptoms, etc.. must be considered.

(3) Parenchymatous X-ray lesion.

(4) History of hemoptysis of a dram or more.

(5) Pleurisy with effusion.

Positive diagnosis may be made on presence of either 1, 2 or 3, or both 4 and 5. If either 4 or 5 be present, tuberculosis is nearly always the cause.

One positive sputum, if reliable, makes the diagnosis of tuberculosis unquestionable. One negative sputum is of little value, so, where in doubt, continue to have sputum examined until some definite diagnosis can be made.

2609 *Hanover Avenue.*

PROPHYLAXIS OF TUBERCULOSIS.*

By H. R. EDWARDS, M. D., Richmond, Virginia.
Clinician, Bureau of Tuberculosis Education, State Board of Health.

As is natural, a physician engaged in public health work must place in the forefront prophylaxis rather than cure; and I venture to say that, so far as tuberculosis may be concerned, it would be difficult to find any authority who might feel inclined to accept the other order of importance.

Under the heading, "Prophylaxis," we will have to include precautions; and if we are able

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15, 1923.

to utilize our knowledge in this respect, not specifically but generally, it is safe to say that tuberculosis would become increasingly rare among human beings and that finally it would disappear.

I shall not here discuss publicity or propaganda. It is too complicated and varied to be condensed within the scope of a single paper. It is one of the most important single agencies in the battle with tuberculosis. In all branches of public health work, the people have to be prepared for efforts in their behalf, feeling naturally antagonistic to things that are beyond their knowledge; and in no branch of the work is education more essential than in tuberculosis. Hence we have the importance of "Propaganda."

There are two governmental functions that might be called essential to the control of tuberculosis. There should be adequate and general inspection of dairies and slaughter houses. No milk should be sold unless the producing cow has been tuberculin tested. Protection in these lines is partial; but it should be general. There should be actually compulsory registration of cases of tuberculosis. We have a Virginia law requiring this registration but it has never been enforced. We are now endeavoring to effect compliance with the law and are meeting with a fairly favorable response; but our efforts must not stop with persuasion if we should find persuasion to be ineffective.

The need for registration cannot be overemphasized. Health officers are powerless to follow up cases when they are ignorant of the existence of the trouble; but when cases are reported, personal and written or printed advice can be given, so the patient may have a better chance of recovery and those near him have a better chance of escaping infection.

As to specific methods for application to individual cases, there should be special efforts made to reduce or remove predispositions to tuberculosis where there has been definite exposure to the disease. Children in families which have tuberculous histories or in which there is a present case of tuberculosis should be carefully examined and regularly weighed. Their dietetic conditions should be safeguarded; needed corrections, such as the removal of diseased tonsils or surplus adenoids, should be made; and the teeth of such children should receive particular attention.

From the viewpoint of either prevention or cure, treatment under ideal conditions is necessarily an expensive procedure, generally beyond the limits of the public purse and frequently too much for private means. Change of climate and surroundings, and the many conveniences that a sick person might reasonably wish, are not within the reach of the average case and are beyond the sphere of public health endeavor; but this handicap to the realization of an ideal should not discourage us.

For, indeed, it is a reassuring fact that our knowledge of tuberculosis and its treatment has in recent years broadened so that now we find ourselves able to cure the trouble anywhere if we find a co-operative patient, eager to be cured and willing to utilize all the aids we give him. This is a very fortunate condition; because the majority of the cases must depend upon home treatment; and it is not likely that ultimately home treatment will supersede sanatorial care.

This feature is here introduced because open-air sleeping is one of the principal features of sanatorial care. Sleeping porches as a preventive aid are eminently desirable; but if it is impracticable to provide a sleeping porch for the child who is to be protected, it is rarely, if ever, impossible to secure for him a room with adequate ventilation and abundance of fresh air. In a well ventilated room into which a constant supply of fresh air is coming, a child should sleep at least ten hours each night. Less than that period is not enough.

Cleanliness is a large factor in prophylaxis, and poverty is no excuse for filth. The house should be clean and the child should be clean. We should bathe frequently and be particularly careful about cleaning the teeth.

Regular living is necessary. Meals should be given at regular hours and the diet should receive particular attention. Milk, and plenty of it should be given; eggs, cereals, vegetables, and meat in moderation should be included in the fare. Abstention from tea or coffee will help to make the child strong and increase its resistance.

Children who are receiving this prophylactic attention should be carefully watched during and following any of the acute fevers, such as measles, scarlet fever, or pertussis; and particular attention should be given them if they

develop any condition that tends to weaken the lungs.

With minor variations, on the whole very similar treatment can be given to the adult as to the child. Whenever a case of tuberculosis has been located it is advisable for the rest of the family to use the same precautions that are recommended for the patient. It is practically certain that all of them have received the infection, and it is virtually sure that some of them may be developing active disease, which, if taken in time, will probably heal and give no further trouble.

Dissipation in any form should be avoided by those who are trying to avert tuberculosis. Regularity of living habits is a prime necessity for keeping fit.

Cold bathing is a great aid to the hardening process and is very necessary in the cure of tuberculosis. If a man accustoms himself to the cold bath by gradually reducing the temperature, he will suffer little discomfort and his body will become inured to changes of temperature, his pores will be toned and elimination increased. All these are factors that lessen susceptibility to tuberculosis.

Fresh air is a necessity not only at night but at all times. Those who work in unsanitary buildings that are poorly ventilated should, if possible, change to better quarters; but, if that is impracticable, they should at least be certain of proper ventilation and of clean surroundings.

Where there is a definite case of tuberculosis, certain precautions should be observed, if the others in the family are to be protected. The sputum of the patient must be burned. Sputum cups are so cheap that almost anybody can afford to buy them; but inability to buy need not prevent their use. There are a number of philanthropic organizations that will gladly give the cups to the men or women who cannot buy them. If the patient does not get the cups or does not have one available when he feels the need of expectoration, he should spit into a paper napkin or a newspaper. Whatever he uses for a receptacle should later be burned. The only exception to this rule that should be tolerated is the use of a glass vessel containing a strong liquid disinfectant and having a tight cover which should not be removed except when the container is being used or cleaned. If any sputum from a tuberculous patient should be spilled, it must be wiped up while moist, with a rag or paper soaked in lysol or mercury bichloride solution.

The patient should keep in his pocket pieces of gauze so folded that after they have been used to cover a cough or a sneeze, they will not allow the moistened part to come into contact with the hands of the patient. It is inexcusable for a tuberculous patient to cough or sneeze without covering his mouth and nose.

These pieces of gauze, just like the sputum cups, should be burned daily. The patient should have with him a container or envelop of some sort for the used gauze. They should never be folded and stuck into his pockets. Used pieces should never be placed with the unused ones.

All dishes used by the patient should be used only by him. They should be washed separately from the dishes used by the rest of the household. Hot soap suds and water should be used for cleaning them, and subsequently they should be rinsed in boiling water. If these precautions are taken a tuberculous patient is not likely to be a source of danger to those near him.

In fact, it may be said that, if any one suffering from tuberculosis is careful in his personal habits and so places his sputum that it cannot get to another person, and if his attendant is careful to see that his table utensils are properly sterilized and kept away from others, people in a home where there is a tuberculous patient are as safe as they would be in an average home, and far safer than they would be where there are careless coughers and sneezers.

THE DIFFERENTIAL DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By W. NELSON MERCER, M. D., Richmond, Va.
Director, Tuberculosis Division, Health Bureau.

First we will consider the physical signs elicited in diagnosing the various lesions in pulmonary tuberculosis, and then the differential diagnosis of this disease.

The important question is to determine whether the signs present indicate a healed or an active lesion. Persistent moist rales, heard after expiration and cough, are the only reli-

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis, held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15 to April 15,, 1923.

able signs of activity in pulmonary tuberculosis. The common physical signs are harshness of respiratory sounds, prolongation of expiration, increased conduction of voice, and more or less dullness on percussion, all of which are usually caused by an advanced process, and very rarely by acute inflammation. When these signs occur in an early case, the patient is usually febrile and evidently ill. In cases of ambulant subjects in apparently good health, the presumption is that the above signs indicate an old, not an early lesion.

The Acute Lesion.

If small, this lesion is manifested by rales with or without changes in breath sounds, percussion note, and voice transmission. The more acute the lesion, the greater probability that its presence will be indicated only by rales. If of large extent, the lesion is distinctly a broncho-pneumonia, characterized at first by the usual signs of pneumonia, crepitant and subcrepitant rales; when caseated, by absence of rales, except coarse and distant rales from the larger bronchi, also by impairment of expansion of the lung, and more or less dullness or tympanitic reasonance; when breaking down, the lesion shows signs of a cavity and the presence of gurgling rales of varying size.

The Active Chronic Localized Lesion.

Activity is denoted by the presence of rales, together with the other signs described under the arrested lesion, but the rales do not of necessity show that the lesion is extending, nor that the activity is of much clinical importance. The more active and recent the chronic lesion, the less marked the breath changes and the more conspicuous the rales.

The Arrested Chronic Lesion.

The arrest of a lesion is characterized by the absence of rales. The signs elicited are harshness of breath sounds, prolongation of expiration, increased vocal fremitus and resonance, and by varying degrees of dullness on percussion.

Disseminated Tuberculosis.

The peribronchial type is common and frequently not recognized. It may be manifested only by distant rales with or without slight changes in breath sounds, usually bronchovesicular. If well marked, there will be lagging on the affected side and increased vocal resonance. Less pronounced cases are distinguished from chronic bronchitis by the character of the rales (coarser in bronchitis) and by their distribution. More frequently the peribronchial type is found with a superficial focus, in which case bronchovesicular breathing with or without rales may extend some distance below the limits of the focus. Extension to the formerly sound lung is the most important point of diagnosis in the peribronchial type. There may be a small apparently arrested lesion on one side, usually the right, with signs of extension involving the whole or greater part of the other lung manifested only by rales after expiration and cough. In ambulant afebrile patients, harshness of breath sounds and prolongation of expiration indicate an old lesion, while the more acute the lesion the greater significance have the rales and less marked are the breath changes. The possible signs elicited in the disseminated type of pulmonary tuberculosis are: diminished expansion at the base, increased tactile fremitus, shorter high-pitched note with heavy percussion, slightly prolonged expiration, rales (often indeterminate) heard near the margin of the sternum in the second, third, or fourth interspaces, and between the scapulae behind (heard after expiration and cough), and sometimes an area of pectoriloquy.

The Differential Diagnosis of Pulmonary Tuberculosis.

It has been shown by various workers in tuberculosis sanatoria that a number of patients admitted as having active tuberculous lesions in the lungs have been proven non-tuberculous, or no active lesions could be found. Among 198 autopsies at the Boston Consumptives' Hospital, 23 cases or 11.5% proved to be non-tuberculous or had no active lesion. In other sanatoria 353 necropsies revealed 38, or 10.8% non-tuberculous. Many hospitals have a large number of "negative sputum" cases, some as high as 50%, which would indicate that mistakes in differential diagnosis are sometimes made, and, therefore, it behooves us to devote sufficient time and care in utilizing all the means at our disposal in the city to reach a correct diagnosis in justice to our patients and to the welfare organizations concerned in their aid and treatment.

For convenience, we will divide the conditions to be considered into two main groups, as follows:

1. Those in which suspicious symptoms predominate.
2. Those presenting definite physical signs in the lungs.

1. Cases in Which Suspicious Symptoms Predominate.

General Asthenia.—These patients are usually women or children who are constitutionally frail, below average weight, have little endurance, and may present symptoms of nervousness, irritability, indigestion, headache, etc., without definite cause. They may have frequent colds and other infections and simulate tuberculosis closely. They should be kept under prolonged observation, and repeated examinations are indicated to make a definite diagnosis. Careful supervision of their daily life will probably restore them to good health, and watchful oversight by the physician will generally produce most favorable results.

Neurasthenia.—This group is similar to the last, but having more pronounced nervous symptoms. The nervous symptoms may be due to tuberculous toxemia, but more often they are not. Prolonged observation with supervision of the patient's mode of life not only makes the correct diagnosis but also is the treatment indicated whether the patient is tuberculous or not.

Hyperthyroidism and Other Endocrine Disturbances.—Malaise, loss of weight, nervousness, digestive disorders, and sometimes a chronic cough, when the thyroid is enlarged, are the usual symptoms. Upon examination, these patients are found to be poorly nourished, have a rapid pulse, are easily fatigued, and may have a slight afternoon rise of temperature increased by exertion or excitement. General examination shows the fine tremor in the fingers, tachycardia, slight enlargement of the thyroid gland, exaggerated tendon reflexes, and possibly exophthalmos—typical signs of hyperthyroidism. The Goetsch adrenalin test and the basal metabolism rate may be of use in borderline cases. Where disturbed balance of the various internal secretions is present, nervousness and malnutrition associated with ovarian or adrenal symptoms may occur. Observation and regulation of the life of the patient over a prolonged period, and probably the use of extracts of animal ductless glands, or in some cases of hyperthyroidism, surgical intervention, result satisfactorily and make the diagnosis.

Fever of Obscure Origin.—(a) Typhoid and Paratyphoid Fevers: Frontal headache, epistaxis, enlargement of the spleen, continued fever without marked morning remissions, and later, tympanites, rose spots, positive Widal and blood culture, make the diagnosis of typhoid. But no other signs than fever often appear for a week or ten days before the above definite signs are evident. If bronchitis complicates typhoid, the differential diagnosis is more difficult. The signs in the chest are not localized, are bilateral at the bases, and vary in location and extent. The early active febrile stage of pulmonary tuberculosis will probably subside in two or three weeks if the patient be put to bed. Repeated examinations of the chest and sputum, and X-ray study will make the correct diagnosis.

(b) Malaria: The symptoms of pulmonary tuberculosis are often mistaken for malaria, but if proper care is taken in getting the history, examining the chest, daily temperature record, blood examination for the malaria plasmodium, sputum examination for tubercle bacilli, and rest in bed, the diagnosis will be made without delay.

(c) Influenza: The diagnosis of "grippe" is often made when other conditions exist, and early localized tuberculosis is most frequently overlooked by physicians, when careful search for signs in the chest combined with sputum and X-ray examination would clear up the diagnosis. Whenever cough and fever continue after the acute stage, tuberculosis should always be suspected.

(d) Focal Infection: In this group of conditions with some constitutional reaction, chest pains, and probably cough, the differential diagnosis from obscure tuberculous lesions is rather difficult. The teeth, tonsils, sinuses, intestines, and genito-urinary tract are usually the seat of such foci, and in doubtful cases should be investigated as the source of infection, after careful examination of the lungs fails to reveal evidence of pulmonary tuberculosis. Irregular fevers will often cease when the focus of infection is removed.

In the above group of conditions with indefinite constitutional symptoms, pulmonary tuberculosis should always be suspected because of its frequency, and with patience and care in the search for direct evidence the correct diagnosis can usually be made.

2. Cases Presenting Physical Signs in the Lungs.

Tuberculous Infection and Tuberculous Disease.—Thus far we have considered the interpretation of general symptoms akin to those associated with pulmonary tuberculosis, and we have found that suitable regulation of the daily life of the patient while he is under observation is of marked value both for diagnosis and treatment of the condition whatever it may be. More difficult are the cases which present slight variations upon physical examination of the lungs. Tuberculous infection is denoted by the signs of slight impairment of resonance, slight alteration in the breath sounds, or fine crackling rales in an apex. When such signs are found, the lesion is of the inactive fibroid type unless accompanied by constitutional evidence of active disease, and it is best determined by repeated examination of the chest and careful observation of the temperature, pulse, fatigue, nutrition, digestion, etc., but without these symptoms the diagnosis of active clinical tuberculosis is not justified upon these physical signs alone.

Conditions Presnting Marked Physical Signs.—Mistakes in diagnosis by the general practitioner in this group of cases are more frequent, due to the need of consultation with those who specialize in pulmonary diseases.

The physical signs are generally marked and extensive, with cough and expectoration. Repeated examination of the sputum for tubercle bacilli, and X-ray study will often clear up the diagnosis. Negative sputum in extensive tuberculosis is extremely rare.

(a) Emphysema and Chronic Bronchitis: This condition is often confused with pulmonary tuberculosis, but the diagnosis can be made by a history of chronic cough worse in winter months, asthma with dyspnea and signs of emphysema, negative sputum for tuberculosis, and coarse rales which are bilateral and inconstant. This condition usually occurs in older people and may be accompanied by chronic tuberculous lesions in the apices with or without tubercle bacilli in the sputum. "Tuberculosis carriers" are often met with in this group which may have been unrecognized as such for years, and they are a constant source of infection to others. Repeated examinations of the sputum and X-ray plates should be made in difficult cases of this group.

(b) Peribronchitis or Chronic Bronchopneumonia: This group is very common, usually following influenza, and may be caused by the pneumococcus, influenza bacillus, or the streptococcus. Symptoms are mild, fever a few days, cough and expectoration, and possibly some hemoptysis. Following influenza the upper air passages and sinuses are often involved. The physical signs are those of infiltration which occur in the lower lobes. The diagnosis is made on the absence of constitutional symptoms with extensive physical signs throughout the chest, negative sputum for tubercle bacilli, but showing the above microorganisms of acute respiratory infection, X-ray picture of linear peribronchial markings slightly increased, and the clearing up of symptoms and signs in a shorter time than similar tuberculous lesions usually require.

(c) Bronchiectasis: Chronic cough, expectoration of large quantities of purulent and foul sputum at intervals, loss of weight, fatigue, dyspnea, cyanosis, fever 99.5 to 101 at times, and possibly hemoptysis, continue for years. The physical signs are indefinite, due to the lesions being either single or multiple and bilateral and they are located usually in the lower lobes of the lungs but may extend upward. If single, signs of consolidation, pleuritic adhesions, or a cavity will be found in the lower part of the chest posteriorly, but when multiple and bilateral the signs are those of a chronic bronchitis with emphysema. Cavities usually form in the lower lobes, rarely in the upper.

The X-ray picture, the characteristic foul sputum which separates into three layers—greenish-yellow, straw, and frothy yellow—negative for tubercle bacilli, the history of the case, and the physical findings will make the diagnosis.

(d) Abscess of the lung usually follows operations on the tonsils or jaws and is preceded by aspiration pneumonia or septic pulmonary embolism. High fever, sweating, emaciation, cough with expectoration of large quantities of brownish, foul, sputum without tubercle bacilli, and probably hemoptysis or hemorrhage form the clinical picture. The physical signs are usually in a lower lobe, the apex remaining clear.

(e) Gangrene of the lung may follow aspiration pneumonia, pulmonary embolism, or the presence of foreign bodies in the bronchi. The symptoms of gangrene of the lung are irregu-

lar high fever, prostration, cough, and large quantities of fluid, fetid, and frothy sputum with particles of lung tissue in the lower layer. X-ray study and sputum examinations aid in the diagnosis.

(f) Cancer of the Lung: Sarcoma and carcinoma of the bronchi, lungs, and pleura may present symptoms similar to pulmonary tuberculosis in the early stage—low grade temperature, cough, hemoptysis, loss of weight. Pressure of the tumor may cause enlarged veins on the chest wall and shoulder or neck and possibly dilatation of the pupil on the affected side with dyspnea as the tumor enlarges. Cachexia, with a waxy-yellow color and blanching of the face, appears in contrast to the feverish appearance seen in tuberculosis. Emaciation is evident much earlier in tuberculosis than in malignant disease of the lung. The physical signs over the tumor are flatness, feeble or absent breath sounds without any rales in the circumscribed area, and above the area of flatness there is an area of resonance, which does not occur in tuberculosis.

When fluid complicates cancer of the lung or pleura the pressure signs given above are more apt to occur than in other conditions, and upon aspiration of the chest, if blood be found, it is strongly indicative of malignancy. The presence of coarsely granular eosinophile cells in the fluid would point to cancer of the lung. The sputum is negative for tubercle bacilli and small in quantity. The diagnosis is made by the symptoms, physical signs, and the X-ray.

(g) Actinomycosis: In the early stages the symptoms resemble tuberculosis—loss of weight, cough, fever, etc., later a fluctuating swelling in the chest wall with signs of pleural effusion appears. The sputum and pus from the swelling show the streaks of actinomycotic growth.

(h) Streptotrichosis of the Lung: The diagnosis can only be made by microscopic examination of the sputum for the streptothrix, as the symptoms resemble tuberculosis closely.

(i) Spirochetosis—Hemorrhagic Bronchitis: The symptoms are cough, copious expectoration, but no fever in most cases, while the general condition of the patient remains excellent. The character of the sputum makes the diagnosis alone as it is viscous and thick throughout, is much like the juice of gooseberries, and contains the spirocheta bronchialis.

(j) Cardiac Diseases: Organic heart disease, notably mitral stenosis, often causes cough, expectoration, hemoptysis, mild fever, and emaciation which would lead to a diagnosis of tuberculosis, but upon careful examination the cardiac lesion will be heard as a presystolic murmur within the apex of the heart. The area of cardiac dullness is usually enlarged in these cases, and the first sound of the heart has a slapping quality. Dyspnea is more marked in cardiac cases than in the tuberculous, and rest for a few days will relieve it in cases of heart disease. In all cases with lesions of the mitral valve and dilatation of the heart showing inconstant rales in the lower part of both lungs, it is safer not to diagnose pulmonary tuberculosis unless tubercle bacilli are found in the sputum.

(k) Syphilis of the Lung: This is very rare and difficult to diagnose when present. There are cough, expectoration, slight fever, loss of weight, and sometimes blood spitting. The lesions are usually in the lower lobes and accompanied by other signs of syphilis in the bones, skin, larynx, etc. X-ray pictures and repeated negative sputum examinations will aid in the diagnosis, but a positive Wassermann reaction will frequently be found in patients who have both syphilis and tuberculosis and is therefore not absolutely reliable in differentiating these diseases. The therapeutic test of salvarsan and mercury in positive Wassermann cases with other suggestive signs of syphilis will often clear up the pathology which is the result of luetic infection.

Osler found only twelve cases of pulmonary syphilis in 2,500 autopsies at Johns Hopkins; and only two cases in 6,000 at the Copenhagen Hospital were proven to be such post-mortem.

Room 409, City Hall.

GRANULOMA INGUINALE.*

By CLYDE F. ROSS, M. D., Richmond, Va.
Associate in Genito-Urinary Surgery, Medical College of Virginia.

Granuloma Inguinale is also known as "Ulcerating Granuloma of the Pudenda," "Granuloma Venereum," "Serpiginous Ulceration of the Genitals," "Groin Ulceration," etc., but none of these names seems to describe the condition in its various manifestations. They all imply it is a disease of the genital regions when

*From the Urologic Service of the Medical College of Virginia. Read before the Medical Society of Virginia at its fifty-third annual meeting in Norfolk, October 31-November 3, 1922.

such is not always the case, so in reality we have no exact terminology for the condition.

Granuloma, for as such will it be spoken of in this article, was originally thought to have been solely a tropical disease having been first reported by Conyers and Daniels[1] in 1896 as occurring in the British tropical possessions, but now the disease has been recognized in the United States and we realize it has been present for years but diagnosed under other names Randall[2] states it has been present in Philadelphia for fifty years and has been recognized but wrongly diagnosed for twenty-five years. In 1920 Symmers[3] reported two cases from the Bellevue Hospital, having been assisted in arriving at a correct diagnosis by a South American surgeon who was visiting the hospital at that time. This condition first came under my observation during the summer of 1918 at the Base Hospital, Camp Greene, N. C. There were mobilized drafted colored troops from North Carolina, South Carolina and Tennessee. I remember several cases diagnosed as syphilis, for want of a more correct diagnosis, which I now know were in reality granuloma. Some of these patients may have had positive Wassermanns but antisyphilitic treatment had no effect upon the lesions and the patients were given surgeons' certificates of disability and discharged. Upon coming to Richmond I was again confronted with this condition, but not until Symmers published his article did we know its true nature and its cure.

Up to the time we reported seven cases before the Medical Society of Virginia in Lynchburg[4] in 1921, there had been only twenty-seven cases reported in the United States by five different writers, but since that time there have been a number of cases reported from those sections of the States particularly where the negro resides. In this report we wish to add ten more cases to our previously reported seven.

Granuloma may be defined as a chronic infectious ulcerating granulating disease, occurring in any part of the body but mostly on or around the genital organs, with no tendency to glandular involvement or serious impairment of health.

The causative organism has not been definitely placed although the consensus of opinion is that it is due to an intracellular encapsulated organism found in large mononuclear cells and known as Donovan's body after Donovan[5] who first found it in 1905. Others, notably Driscoll[6], believe it is due to a symbiosis of the spirillum and the fusiform bacillus, the same organisms causing Vincent's angina and erosive or gangrenous balanitis (fourth venereal disease). Randall has done a great deal of work in trying to prove Donovan's body the true cause but has never been able to reproduce the disease. In three of his sixteen cases an organism was cultured which resembled the organism seen in the mononuclear cells. He as well as Symmers, Campbell[7], Lynch[8], and others have found the Donovan's body almost universally present in their reported cases, while Aragao[9] claims the organism is pathognomonic of the disease. We have been very unfortunate in our attempts to locate the organism. Seven patients were examined with positive findings of the Donovan body in only one case and the spirillum in two. In the one case in which the Donovan body was located we also found the spirillum. Two patients are now undergoing examinations and in eight no attempt was made to locate organisms.

Its mode of transmission is also as yet undetermined. We do not believe it is venereal in origin for in all of our cases, with possibly one exception, we have never known of one patient conveying it to another, yet there are histories of men and women living together with no transmission of the disease. It may prove to be an insect borne disease as by the pediculosis pubis.

Conyers and Daniels[1] give the following description of the microscopic picture with which we agree and upon which we have depended along with clinical findings for a diagnosis:

"The mass of nodules are composed of round cells, with a large (but usually badly staining) nucleus, contained in a delicate reticulum of fibrous tissue. This mass is covered by epithelium in its greater extent and in the older and larger nodules merges gradually into a subadjacent dense fibrous stroma in which small masses of similar rounded cells are embedded. The growths are very vascular and the capillaries are much dilated, but there are no hemorrhages. There is no sign of suppuration or caseation, and no giant cells are found in any of the sections. The overlying epithelium has undergone certain modifications; it is usually intact; or cracked and occasionally over small areas absent or ill formed. and the cells of the rete malpighii are ill defined and swollen. None of the pigment so characteristic of the colored race is found in

the deeper layers. In many specimens there is a proliferation of the interpapillary epithelium, in some, sufficient for columns of epithelial cells to appear to descend into the round celled growth. In some, on the other hand, the papillae have almost disappeared from a more widespread proliferation of the epithelium. The hair follicles in many cases share the epidemic thickening, and the hairs grow strongly and are not changed in color. In a section of a small nodule the round cell mass will be found to be roughly wedge-shaped, the base of the wedge being towards the skin, the growth ascending with the vessels into the papillae."

The lesions seem to be both primary and secondary in origin. When beginning primarily, it may start as a papule, pustule, or nodule which ulcerates, and upon the base of this ulcer granulations appear and spread by contiguity or usually by continuity of tissue. If it is secondary in origin, the infection seems to be engrafted upon some prior lesion as an inguinal bubo. Fourteen of our cases were primary and three secondary. The three latter were secondary infections of buboes.

The lesion presents itself as a light red mass of granulation tissue which in the older cases ulcerates in the center and heals, leaving a firm raised cicatricial area covered by very thin epithelium. The granulating areas vary in the amount of elevation but are usually more raised at their margins and depressed in the center. They are covered by a thin, pearly grey scab and, except in moist regions, have very little secretion. This secretion may be fetid or not.

At times, instead of there being tissue proliferation, there is ulceration with great destruction of tissue, particularly so if the lesions affect the glans penis, prepuce, or vulvae, When healed, the scar tissue often contracts and produces deformities, especially so if it involves the urethra, vagina, or anus. Instead of the disease being at all times of long continued duration, there seems to be an acute form of very rapid destruction.

In our male patients the lesions were confined to the glans penis and prepuce in four cases, and in the other nine there was an involvement of the inguinal region in every case, with extension to other parts in some cases. In one of the latter there was an involvement of the mouth, nose and throat. The typical inguinal granloma begins in the inguinal region, either on one or both sides, extends upward towards the anterior superior spine and downwards into the inguinal folds. If untreated, it will spread over the perineum, around the folds of the nates and up over the sacral region. None of our recent cases have been so extensive, as the diagnosis has been made during the early stages.

In our female patients the vulvae seem to be the site of predilection as in all four the vulvae were involved, with involvement of the inguinal region in two cases. In two cases there were extragenital lesions, one involving the neck and another involving the mouth, showing a high percentage of lesions out of their normal location.

The lymph nodes are not involved and the subjective symptoms are slight. All of our patients have been in the colored race, although Randall and Lynch both report one case each in the white race. By men doing work among both sexes, it is reported as freely in one sex as the other. The female cases reported by us have been only those seen in consultation.

In the past these lesions have been variously diagnosed chancroidal ulcers, syphilis, condylomata acuminata, tuberculosis cutis, and epithelioma. Except when secondarily infected, it does not resemble the chancroidal ulcer in that it has not the ulcerated undermined edges nor the foul purulent discharge of the chancroidal lesion.

Since the advent of the Wassermann and arsenic therapy, it is not so often confused with syphilitic lesions. Although a number of these patients showed a positive Wassermann, yet anti-syphilitic treatment had no effect upon the lesions. In fact nearly all of our patients had had arsphenamine with no improvement, whether they had positive Wassermanns or not. The absence of the tubercular bacilli, the clinical and the pathological findings should serve to distinguish granuloma from tuberculosis cutis. The presence of glandular enlargement, metastasis, and the pathological picture should differentiate malignant disease from granuloma.

Until the organism causing the disease can be positively identified, the diagnosis will rest upon clinical findings, pathological examination of sections, and the results of antimonial therapy. Any granulating or ulcerating lesion around the genitals or located elsewhere, resistant to ordinary surgical treatment, unimproved by anti-syphilitic remedies, of long

duration, devoid of pain, should be given the advantage of tartar emetic therapy.

In antimony and potassium tartrate we have added one more drug to our list of specifics and most likely opened up a new field in drug therapy. Recent literature refers to its beneficial action in bilharziasis, filariasis, gangosa, cachar sore, malaria, leishmaniasis, and trypanosomiasis. We have yet to see a case of granuloma which could not be cured by its use and in our experience with drugs none has shown the marvelous healing powers as tartar emetic in this disease.

Antimony and potassium tartrate were first used in the treatment of granuloma by Aragao and Vianna in 1912, but the success attained was not so great until its was used intravenously. Hoffman[10] first reported its use intravenously in 1920. In our seventeen cases, thirteen were healed, two discontinued treatment, and two are now undergoing treatment with great improvement.

The U. S. P. Tartar Emetic (Antimony and Potassium Tartrate) in sterile distilled water is used intravenously in one per cent solution. The initial dose is 5 c.c. and is increased one c.c. each dose until 10 to 12 c.c. are given at a dose. This amount was diluted up to 25 c.c. by sterile distilled water and injected three times a week. Improvement is usually noticed after three or four injections. The drug in some patients causes immediate vomiting which lasts only a short time. To prevent this all patients are instructed to return for treatment with empty stomachs. We have never experienced any severe untoward symptoms. The oral administration of tartar emetic has not been attended with visible improvement. Caution should be observed not to spill any of the solution into the tissues as the results are very distressing. After lesions have healed, treatment should be continued weekly for three months to prevent recurrence. This after-treatment is very essential and should not be neglected. In two cases where it was neglected, there were recurrences which responded readily to more treatment.

Owing to the fact we have as yet no complement fixation test for granuloma, as we have in syphilis, it is impossible to say if these patients are cured or just temporarily relieved. It may be found necessary to repeat courses of treatment in this disease every year as we do in syphilis.

In our seventeen cases, ages ranged from seventeen to fifty years. Thirteen were males and four females. Fourteen were primary and three secondary. Duration of the disease was from one month to eleven years, as follows: one, eleven years; three, ten years; one, eight years; one, seven years; two, two years; five, one year; and four, less than one year. The amount of tartar emetic given was from six to forty grains and the period of treatment extended from two to six weeks.

REFERENCES.

1. Conyers and Daniels, British Guiana Med. An. 8:13:1896.
2. Randall, Small and Belk, Surgery, Gyn. and Obs. 6:717:1922.
3. Symmers and Frost, J. A. M. A., 1920:lxxiv:1304.
4. Ross, Clyde F., Va. Med. Monthly, January, 1922.
5. Donovan, Indian Med. Gaz. 49:414:1905.
6. Driscoll, T. L., Arch. Derm. and Syph. 38:170: 1920.
7. Campbell, M. F., J. A. M. A. 76:648:1921.
8. Lynch, M. K., J. A. M. A., 77:925:1921.
9. Aragao, Braz. Med. Rio De. Jan., 32:74:1919.
10. Hoffman, Muenchen, Med. Wchnschr., 67:159:1920.

501 *Professional Building.*

EMPYEMA.*

By J. K. GRAY, M. D., Marion, Va.

During the past five years there has been a greater incidence of empyema among both the civil and military population than has ever been noted previously, and special advantages for the study of this disease have been afforded by the comparison of the various methods of treatment as carried out upon large groups of cases. Much has been learned during this time and the mortality has been markedly lowered by a clearer understanding of the physiologic and pathologic processes involved and the formulation of better and more individualized methods of treatment. It seems opportune at this time to present for your consideration a review of the established principles in the diagnosis and treatment of this condition and in addition such data as will modify or change them.

ETIOLOGY: At one time regarded as a disease which occurred only rarely, except as a sequel or late complication of lobar pneumonia, we have now to recognize empyema as occurring very often as an early complication and especially so with the streptococcus bronchopneumonia and that following measles. The hemolytic streptococcus has been found to be responsible for most of the epidemic cases, especially where complicating bronchopneu-

*Read before the Southwestern Virginia Medical Society in Christiansburg, May 17, 1923.

monia, while the pneumococcus has been found to be the causative factor in the sporadic cases.

PATHOLOGY: The amount and character of the exudate, as well as the time of occurrence, has been found to vary with the type of organism present. The streptococcus is apt to produce a large fluid exudate in a short time, later tending to become purulent. The influenza type tends to produce only a small amount of fluid and this is purulent from the beginning. On account of the small amount present, it has been found that occasionally it will be absorbed spontaneously, but this of course is the exception rather than the rule. The pneumococcus exudate is purulent at all stages of its development, and large in amount. All of these types of exudate may contain large flakes of fibrin and especially if allowed to remain undrained for any length of time. The pleura having reacted gradually to the infection is in the usual case thickened and resistant; however a serious pathological condition is sometimes found in the presence of an encysted empyema. The rupture of such into an uninfected pleural cavity is a serious accident, it appearing that the sudden contact of so much septic material with the undiseased pleura has much the same effect as it would on the peritoneum. The gross findings in chronic cases have been more cleary outlined by the use of the X-ray, especially in determining the position and extent of cavities and sinuses when injected with some opaque material.

DIAGNOSIS: There has been nothing of great importance added to the knowledge concerning the general principles of diagnosis of empyema as carried out by careful history and observation of symptoms and a thorough physical examination. The laboratory methods of diagnosis however have been more fully developed and under the heading two main features are to be considered.

First: Bacteriologic examination of the discharges should be carried out both in diagnosis and treatment, this being important in that it helps not only in the planning of how and when to operate, but also as a control during the treatment with antiseptic solution and as a guide toward when closure should be permitted to take place or plastic operation attempted.

Second: An X-ray plate and fluoroscopic examination, while not absolutely necessary, is a valuable aid in diagnosis. However, after the cavity is drained, and especially if air is allowed to enter, it is difficult to interpret the findings, because of the great variations in density of the chest contents. In the investigation of chronic cavities in order to determine position and extent, the best method of outlining the cavity has been found to be by injecting with 20% bismuth and 3% acacia in cottonseed oil. This procedure was also successfully employed by Stevens as a guide in determining the extent of expansion of the lung in empyema cavities of long duration.

TREATMENT: Up to the period of the outbreak of the war, the established method of treating empyema as soon as discovered was immediate thoracotomy, with or without rib resection, and usually no irrigation was instituted for several days, if at all, later on exercises to encourage lung expansion were instituted and suction apparatus was used by some, but the results were not generally satisfactory. The tremendous mortality of empyema among the soldiers at Camp Lee at the outbreak of the war was investigated by a specially appointed commission who found the streptococcus to be the etiologic factor, complicating streptococcus pneumonia. They found that early operation had been performed in most cases, and with fatal results in many: so that a policy of deferred operation was adopted whereby repeated aspiration was performed on the acutely ill cases in order to relieve the pressure symptoms until the pneumonic process had subsided. At this time the usual thoracotomy was performed and Dakin's fluid irrigations established. The preliminary treatment by aspiration has even resulted in a recovery without operation in several cases. However, in none of these has there been formation of real pus. The adoption of this policy and method resulted in very gratifying results.

The Thiersh method of treatment has been revived with modifications. This method was devised to prevent collapse of the lung by pneumothorax and consisted in passing a large caliber rubber catheter into the pus cavity by means of a trocar and attaching a flexible rubber tube to the end of the catheter so that the walls of the tube would collapse on inspiration and prevent the entrance of air, at the same time allowing free drainage. A modification of this method is the closed method of Mozingo, whereby Dakin's fluid is instilled and withdrawn through the tube at such intervals as are deemed necessary to sterilize the cavity and

remove the pus. This method is applicable in many cases and has several advantages, such as simplicity, avoidance of shock and prevention of sacrifice of tissue. It is agreed by a great many that Dakin's fluid irrigations are practical and safe, provided first an injection of physiologic saline is used in order to determine the presence of an opening into a bronchus in which case the injection of Dakin's fluid would be followed by unpleasant results due to irritation. The method is naturally adapted to cases in which the pus is in a fluid state and the presence of fibrinous masses would be a serious objection to its use and indication for a wide opening in order to permit their escape. With the antiseptic irrigation treatment properly carried out, it is probable that the formaldehyde and glycerine injections would not be necessary and, in addition, there is a tendency toward pleural thickening with such treatment. The technical nature of this procedure might prove to be a drawback in some cases where the operator was not practiced in the technique. As an emergency procedure, therefore, simple aspiration with a large caliber needle would be sufficient to relieve the condition until a better method of treatment could be carried out. There has been some criticism of the use of Dakin's fluid on the ground that it is too irritating to be used in the pleural cavity. Notwithstanding the fact that Dakin's fluid is not absolutely essential in the treatment, it appears that it has shortened convalescence in many cases.

This method while apparently mechanically perfect is not without the disadvantage that after four or five days there is a tendency toward retraction of the skin around the tube and consequent leakage of pus. If this did occur however, one would still have the choice of a resection and drainage, and probably by that time the patient would have passed over the critical period and other changes have taken place within the pleural cavity which would render thoracotomy a safer procedure than if it had been undertaken in the first place. A modification whereby the entrance of the tube could be made air-tight has been devised, and is made effective by means of circular cap of rubber made air-tight around the tube and to the skin by means of Sinclair's glue. In cases where there is no tendency for the lung to expand under the closed method of treatment, it is an indication that a dense fibrous layer is forming upon the surface of the lung with resulting compression. In such a condition, provided the acute stage of the disease has passed, prompt operation is indicated with the freest possible drainage and irrigation in addition. The choice of operative procedure, whether by the conservative method in which drainage and irrigation are carried out through a tube passd through an air-tight opening in the chest wall, or the more established method of rib resection, must be governed by individual needs of the case. An aid in the formation of this decision is character of the organism. It has been observed that streptococcus empyema occurs early with pneumonia, while the pneumococcus follows the lung process later. The character of the pus in the streptococcus type is usually thin enough to be aspirated or withdrawn through a tube, while in the pneumococcus type it is usually thick, contains fibrous masses and can only be effectually evacuated through a large opening. There have been great advances in the treatment of chronic empyema and in the hands of Keller of the Army Medical Corps a new method of procedure has been adopted whereby with the use of Dakin's fluid for obtaining asepsis, and a policy of dividing the operative procedure into a number of brief stages, he has been able to obtain remarkable results in a great number of apparently hopeless cases.

As regards treatment, in conclusion let it be said that, as far as the anaesthetic is concerned, the use of a general anaesthetic has been found not necessary with properly induced local anesthesia and some have gone so far as to say that it is criminal to employ general anesthesia.

Prognosis: Expansile power of the lung and especially activity and tone of the diaphragm are rapidly restored following removal of septic material and irrigation with Dakin's fluid or salt solution. Failure of expansion of the lung has been found more often to be due to the surface being covered with septic material due to which the physiologic activity of both the lung and the diaphragm are retarded, and in the presence of this failure to expand, caution should be exercised in the closure of the external wound lest pus pockets, sinuses, and cavities be found later to exist. The outlook for recovery has been improved and the number of chronic cases lessened as methods have been adopted more to suit the needs of the in-

dividual case. A certain number of cases have resulted fatally, but only in the face of overwhelming complications, where the treatment has been carried out properly. The causes of chronicity have been made more plain by recent methods of study, rendering direct attack upon the underlying causes more effectual.

Conclusion

First: Extensive operation, as by rib resection, should not be performed as long as there is a pneumonic process in existence.

Second: Remove pus during the acute stage duly by aspiration or air-tight tube drainage, especially if respiration is mechanically embarrassed by the accumulation of a large amount of fluid.

Third: Operate as soon as the pneumonic process or acute stage has subsided, by rib resection and wide drainage or tube drainage with free irrigation.

Fourth: The early and continued use of irrigating solution, both normal saline, and Dakin's fluid, for both their mechanical and bactericidal actions is indicated.

Fifth: Chronic empyema is more rare than formerly and the outlook when it does occur has been made more favorable by the use of Dakin's fluid and a specially developed operative procedure.

RENAL TUBERCULOSIS.*

By W. O. POINDEXTER, M. D., Newport News, Va.
Urologist to Elizabeth Buxton Hospital.

Tuberculosis of the kidney constitutes one of the important chapters of surgery and certainly one of extreeme importance to the urologist, since 25% or 30% of all the surgical lesions of the kidney are tuberculous. The statistics of Kronlein and Israel bear this out. Caulk of St. Louis found fifty-five tuberculous kidneys in two hundred and fifty surgical operations upon this organ.

By the introduction, retention and colonization of tubercle bacilli in the kidney many types of morbid processes may develop. The French school classifies miliary tuberculosis, nodular tuberculosis and tuberculous nephritis. It seems satisfactory to classify two main types, (1) acute miliary and (2) chronic or surgical tuberculosis, and in addition we may have (3) a toxic tuberculous nephritis.

Authorities are now pretty generally agreed that the vast majority of cases of renal tuberculosis represent blood borne infection from some other source in the body, such as lung, bone, gland, bowel, or joints, which first attacks the kidney and then the ureter or bladder secondarily. Primary infection of the urinary bladder through the urethra is an exceedingly rare occurrence. Kuster states that 10% of patients dying of tuberculosis have renal involvement.

The question of ascending renal infection along the ureter from a bladder focus has long been a favorite topic of energetic controversy between both clinical and experimental observers of large experience. Most observers, however, hold that while this is a theoretical possibility which now and then may materialize, it is certainly exceptional and most of the reported cases admit of more rational interpretation on the assumption of independent and repeated haematogenous infection. The masterful work of George Walker showed that ascending infection up the unobstructed ureter did not occur. Bauerism states that with the flow of urine unobstructed, tubercle bacilli cannot reach the kidney intra-ureterally. Infection along the ureteral lymphatics, both in tuberculosis and non-tuberculosis, has certain advocates. Most authors concur in the belief that the usual path of infection is through the blood stream, and there is abundant evidence to warrant the conclusion that this is the most universal manner of renal infection. With a small tuberculous involvement within the body, there are frequently temporary bacillemias. It is therefore easy to appreciate how a kidney, constantly filtering organisms, could under certain conditions become infected.

As to the exact location of the initial lesion within the kidney, there is dispute. Cabot and Crabtree, in their work, seem to believe that experimentally the earlier lesion is at the base of the pyramid between the cortex and is more common in the tubular region. In the massive or ulcerative type the organ becomes converted into multiple cavities, which may communicate with the pelvis, are separated from one another by septa of disintegrating renal or fibrous tissue and filled with necrotic material. This may go on to complete destruction of the parenchyma. If the ureter becomes permanently obstructed before the secretory portions of the kidney have been fully destroyed, tuberculous pyonephrosis results.

Then the organ again may be studded with

*Read at the meeting of the Walter Reed Medical Society at Smithfield, Va., in the fall of 1922.

numerous firm grayish-white nodules varying in size from one to three or four millimeters in diameter which show little or no tendency to ulcerate.

Total obliteration of the ureter is produced by superficial ulcers which destroy the mucosa and submucosa, leaving intact the muscle wall, the occlusion being affected through regenerative changes with scar tissue formation.

Now, then, what should lead us to suspect the existence of this disease and how are we to establish the diagnosis? Fortuntely, there is rarely any great difficulty if we are careful to obtain a complete, accurate history, and then resort to the various methods of examination now at our command.

The disease is preeminently one of young adult life and is by far the most frequent of all purulent renal affections of this period. Not only is it unilateral at the outset in over 90% of cases, but the relative infrequent and extraordinary late involvement of the second kidney is a striking characteristic which has a most important bearing upon the treatment. The disease may long remain symptomless and be first observed through a mixed infection. On the other hand, while still confined to one kidney and in the early stages, it may give rise to any one or all of a characteristic group of symptoms which should lead to its prompt detection.

These may be conveniently divided into (a) local and (b) constitutional symptoms. Constitutional Symptoms may be summed up as follows: Irregular fever, night sweats and lastly emaciation.

Local Symptoms:

Frequent and painful urination, present both night and day. The pain is referred along the course of the ureter and to the neck of the bladder, coming, as a rule, at the end of urination.

Haematuria. Intermittent haemeturia without obvious cause should always be suggestive of renal tuberculosis, as this may be the first symptom. The bleeding is continuous for days or weeks at a time, differing from haematuria associated with calculus, and total instead of terminal which usually signifies some bladder lesion.

Pyuria. Pus is present at some time in all cases, the urine is pale, low specific gravity and usually acid, but may become alkaline through a mixed infection. The pain in renal tuberculosis is dull and aching in character and may radiate along the course of the ureter. It may be colicky in type and very severe when the ureter may become blocked by a blood clot or caseous material thrown off from a disintegrating kidney.

Tubercle bacilli can usually be demonstrated in the urine if persistent and repeated search is made from the twenty-four hour specimens. Crabtree claims they can be found in practically all cases if the urine is allowed to stand for a while and, after pouring off the supernatant fluid, the sediment be centrifuged by high power for one to two hours. But we must not forget that it is possible for tubercule bacilli to be excreted in the urine by a healthy kidney which is not tubercular. If we fail to find the bacilli in the urine we must then resort to animal inoculation; the disadvantage of this test is the time required.

When the disease invades the bladder, we have the symptoms of cystitis. There is frequent, urgent urination night and day, associated with great pain both during and at the end of urination. The viscus becomes extremely intolerant and irritable and robs the patient of all restful sleep. Emptying the bladder affords little or no relief and, as the disease advances, marked strangury and tenesmus dominate the symptom-complex.

Cystoscopy is an invaluable aid in enabling us to determine accurately certain points: first, to make a positive diagnosis; second, to determine the location, extent of renal involvement, and third, to investigate the functional activity of one or both kidneys.

In advanced cases the bladder is so intolerant of instrumentation that an anesthetic may have to be given; spinal or sacral usually suffices. In the early stage we usually find the ulcerations of the bladder, which are either discrete or grouped around the ureteral orifice or trigone as minute, slightly elevated, greyish-yellow nodules, surrounded by a zone of hyperemia. This tendency to localize around the ureteral orifice or trigone is of diagnostic value.

If the case is examined when the disease is still confined to the region of one ureteral orifice, pictures are seen which may be considered practically diagnostic. Thus ulceration confined to this region indicates that the kidney of that side is almost surely diseased. A puffy red ureteral orifice in an otherwise healthy looking bladder is very suggestive. So also is the retracted crater-like ostium. Then again the orifice may be enclosed in a circle of little vesicles or the so-called bullous-edema, which

is almost pathognomonic of descending renal tuberculosis. Catheterization of the ureter with a comparative study of the urine collected from both sides, by volumetric, bacteriologic, chemical and microscopic methods, is of the greatest help in establishing the diagnosis, revealing the extent of the disease and the competency of the non-infected kidney. So, too, we can observe directly the exact time of appearance in the urine of indigo-carmine or phthalein that has been given hypodermically. We may also by injecting some opaque substance into the kidney pelvis, such as 25% sodium bromide (which is the least irritating of all), determine the amount of dilatation, and the outline of the calyces.

To Summarize: We should take a careful history; make a general physical examination to disclose a primary focus elsewhere in the body; measure the bladder capacity which is greatly reduced; note a contracted, irritable viscus intolerant of instrumentation, a cystitis resisting or even aggravated by treatment especially the silver salts, and the persistent acid pyuria from which no organisms grow on ordinary media, associated with the other urinary findings already given. We should also note the cystoscopic findings, and the impaired kidney function with the radiographic disclosures, and finally the use of tuberculin in proper selected cases. If after exhausting all these measures the surgeon is still uncertain, it is a perfectly legitimate procedure to investigate it directly through an exploratory lumbar incision.

Treatment: The most important feature in the surgical outlook of the tuberculous subject is the finding of a unilateral tuberculous kidney and finding it early before the late results have become manifest. Some authors advise the removal of the most diseased organ in bilateral tuberculosis but others believe this to have very little effect on the other organ. In bilateral tuberculosis surgical efforts do little, except for renal drainage, to protect a seriously bothered bladder.

The length of operation is very important, especially in regard to the anesthetic. Careful dealing with the perirenal fat is very important, since it has been definitely shown that many of the persistent tuberculous sinuses are due to infection in the remaining fat. As far as possible the fat should be removed. Treatment of the ureter varies with the different cases. Many amputate low down as possible and do not drain. It is useless to try to remove the entire ureter as the most important part has to be left, that is the intramural part, and most authors feel that such removal is unnecessary. The bladder lesions usually heal after the removal of the tuberculous kidney, the time being in proportion to the severity of the infection.

Tuberculin after operation is claimed by some to be of much benefit, as it seems to hasten the healing of the wound and the amelioration of the bladder symptom. For the painful bladder, I know of nothing better than mercurochrome. Such patients are all put in the sunlight and under the usual tuberculous hygiene.

138 *Twenty-sixth Street.*

BACILLUS ACIDOPHILUS AS A THERAPEUTIC AGENT.*

By GEORGE F. REDDISH, Ph. D., Richmond Va.
Associate Professor of Bacteriology, Medical College of Virginia.

At the last annual meeting of the American Association for the Advancement of Science (December, 1922), Dr. A. B. Macallum, of McGill University, chairman of the section of Physiology and Experimental Medicine, took as subject for his address "The Urgency of Research on the Great Portal to Disease in the Body, the Intestinal Mucosa."[1] This is by no means a new idea to most physicians and bacteriologists alike, but Dr. Macallum is so positive in his claims that this channel is of first importance in the introduction of many diseases, that it seems worthy of serious consideration. He first calls attention to the fact that the intestinal mucosa when functioning properly is capable of warding off the poisons elaborated in the intestines as a result of putrefaction caused by certain of the intestinal bacteria; because of this selective action, it is capable of protecting the body from these harmful products. After being continually subjected to the action of such poisons, however, these cells gradually lose the property of functioning in this way, and then some or all of these products pass into circulation, giving rise to many and varied complications. Dr. Macallum[1] states further:

"It is not too much to say that in this failure on the part of the epithelial cells an explanation may be found of the origin of a large number of diseases of the body. It is my firm conviction that arteriosclerosis, hepatic cir-

*Read before the Richmond Academy of Medicine and Surgery, February 23, 1923.

rhosis, acute yellow atrophy of the liver, nephritis in some of its forms, angina pectoris, senile dementia and dementia precox are all due to failure, more or less pronounced, on the part of the intestinal epithelial cell to play its normal part. In some cases this failure may develop suddenly as in acute yellow atrophy, in other cases it may involve a gradually lessened capacity of the epithelial cell to reject or neutralize the products of putrefactive action. That dementia precox has this origin is indicated by the facts that it is frequently associated with intestinal stasis more or less pronounced and that not infrequently in this disease there may be atrophy of the testes or ovaries, facts that can only be explained by supposing that not only this atrophy but the degeneration of the cortex are due to the action of toxins of intestinal origin. Senile dementia, when not of arteriosclerotic origin primarily, is probably due to a gradually lessened capacity of the intestinal cells to reject the toxic products of putrefactive fermentation."

"The intestinal mucosa must then be regarded as the great portal to disease of the body. This portal may be completely closed as it is in the normal healthy condition of the mucosa or it may be gradually or suddenly pushed open and disease, chronic or acute, may result. If this portal could be kept closed always old age might be indefinitely postponed and bodily vigor maintained for a much longer period than it is now. There is no reason to suppose that the heart, the skeletal muscles, the liver, the kidneys, the nervous system and the endocrinous organs cannot function indefinitely if they are not subject to toxic action and in their normal condition they must be much less subject, through any other portal, to bacterial infections than they are when their condition is altered by the access of toxic material absorbed from the intestinal cavity. The complete closure of the great portal permanently maintained would greatly lessen the incidence of disease and increase the average length of life."

"It is probable that excess in diet, especially in its protein constituents, may task the capacities of the epithelial cells and diminish their power to react normally, with the result that they allow to pass through them, and to the underlying tissues and the circulation, the products of intestinal putrefaction which in their healthy vigorous condition they do not permit to enter them. This would explain some of the pathological results of a high protein diet. It is also very probable that the primary and most important action of vitamins in diet is on the epithelial cells which, with the glandular structures below them, as McCarrison has found in his observations on animals fed on autoclaved food, undergo marked atrophic and necrotic changes, followed by an extensive invasion of the mucosa by bacteria. The changes which other organs show in avitaminosis have yet to be shown due directly and not indirectly to their deprivation of the vitamins. Once the Great Portal is thrown wide open, neuritis, degenerative changes in the pancreas, thyroid and spleen, atrophy of the testes and ovary, and hypertrophy of the pituitary and adrenals may be of toxaemic origin. Constipation also seems to be one of the earliest results of avitaminosis and its causation may be similarly explained."

That toxins of intestinal origin are a factor in many of the diseases mentioned above, as well as other less definite complications, is well-known to the medical profession. As a factor in promoting health and in prolonging life, the condition of the intestinal canal must be given primary consideration. Just what condition in the intestines is most favorable for normal life, for good health and for a possible long life? The tendency at the present time among bacteriologists and physicians is to consider a simple bactrial flora in the intestines as one of the most important factors to be included. Granting that there may be other factors of equal importance which may be developed later on, some recognition must be given to the very conclusive data already at hand to support the claims for a simplified flora as an aid to this end.

As already indicated, the intestinal bacteria which cause putrefaction are the real cause of the above diseases which result from absorption of toxins through the intestinal mucosa. The first object, therefore, would be to eliminate the cause of the poisons which were being elaborated. The use of intestinal antiseptics is not recognized as efficient for this purpose, and the value of their use has even been definitely discounted through careful experimental work. Fantus[2] has shown that calomel does not exert a germicidal effect on the intestinal bacteria when administered in the usually

prescribed dosage. It was also found by Dragstedt, Dragstedt and Nisbet[3] that the usual antiseptics employed for hand sterilization would not destroy bacteria when placed directly within a section of the intestines of dogs. It was found that dogs died from toxemia of bacterial origin from closed segments even when these strong antiseptics were added and held for certain lengths of time. It seems, then, that other agents besides intestinal antiseptics should be resorted to in checking the activities of these harmful bacteria.

Within recent years, results of research on changes in intestinal flora due to diet have shown that the flora can be materially changed if the proper diet be consumed. It has been shown by Rettger[4] and his colleagues, at Yale, Torrey[5] and others, that a high carbohydrate diet will yield a change in bacterial flora from one consisting largely of putrefiers and gas formers, to one composed almost entirely of aciduric types. Such a change can be brought about readily by the administration of large amounts of milk sugar. Rettger has shown that a similar result can be secured by the ingestion of young milk culture of B. acidophilus even more readily than by means of high carbohydrate diet. At present, the latter method is decidedly more popular than the former, not only because of the better results obtained, but also because of the more palatable taste of the latter and more agreeable effects. Broth culture has been used by Gompertz and Vorhaus[6] with very good results. So far, experience has shown that B. acidophilus is more viable and lives longer in milk than in broth culture, and decidedly better than in such commercial products as are being put upon the market in various forms. The activity in the commercial field is indicative of recognized merits of the principle, but unfortunately most of the products are of questionable value. Those commercial products which have lactose or dextrin as their principal constituent are of value, but the price charged is somewhat out of proportion to the cost of the constituents. The number of reliable concerns which are interested in this matter is indicative of a deep interest in this therapeutic agent.

Admitting that it is usually not advisable to go against the laws of nature, and that constipation and a putrefactive flora are normal to adults, it still is not illogical to attempt to prevent premature old age, and such conditions as arteriosclerosis by producing an infantile condition in the intestines. In fact, this would seem entirely logical, and certainly has been of definite benefit clinically in a large number of cases. At the present time, this measure seems to approximate the ideal suggested by Macallum as a means of preventing degeneration of the intestinal mucosa more nearly than any other at hand. Therefore, it seems that this agent should receive a thorough trial clinically in the hands of the practicing physician and, should it prove to supply the necessary means to bring about the desired result, be accepted into his general practice as a permanent treatment for such types of disorders for which it is suited.

BIBLIOGRAPHY.

(1) Macallum, A. B. 1923. Science, Vol. LVII., No. 1468, pp. 189-194.

(2) Fantus, B. Useful Cathartics, Chicago. American Medical Association, p. 97.

(3) Dragstedt, L. R., Dragstedt, C. A. and Nisbet, O. M. 1922. Intestinal Antiseptics: Effect of Antiseptics on a Type of Experimental Intestinal Toxemia. J. Lab. and Clin. Med., Vol. 8, p. 190.

(4) Rettger, L. F., and Horton. 1914. A Comparative Study of the Intestinal Flora of White Rats Kept on Experimental and Ordinary Mixed Diets. Centralb. f. Bakt., Abt. 1, Orig., Vol. 73, pp. 362-372.
Rettger, L. F. and Cheplin, H. A. 1921. A Treatise on the Transformation of the Intestinal Flora with Special Reference to the Implantation of Bacillus Acidophilus. Yale University Press, New Haven, Conn.

(5) Torrey, J. C. 1915. The Fecal Flora of Typhoid Patients and Its Reaction to Various Diets. J. Inf. Dis., Vol. 16, pp. 72-108.
Torrey, J. C. 1919. The Regulation of Intestinal Flora of Dogs Through Diet. J. Med. Res., Vol. 39, pp. 415-447.

(6) Gompertz, L. M. and Vorhaus, M. G. 1923. Bacteriologic and Clinical Experience with Bacillus Acidophilus. J. A. M. A., 80, pp. 90-92.
Observations on B. Acidophilus. Medical Record. 1921. Vol. 100, pp. 497-499.

THE CONTUSED ABDOMEN.

By E. B. CLAYBROOK, M. D., F. A. C. S., Cumberland, Md.

In March 1913, I read a paper before the Eastern Panhandle Medical Society, at Martinsburg, W. Va., the title of which, was "Injuries of the Abdominal Viscera, Without External Evidence of Injury." At that time, I reported eight cases and referred to two others previously reported that had occurred in my practice.

In a paper read before the Southern Medical Association in Asheville, on injuries of the

spleen, I reported four cases of this type. In looking over my records, I find that since these reports I have operated on seventeen other cases of visceral injury without external evidence. These injuries varied from small tears in the mesentery, to large tears in the bowel and liver. There was one case of severe laceration of the kidney.

Therefore, it seems that such injuries are quite common in occurrence and, if I may judge from the few referred cases I have seen, they are very often overlooked. One young man that I saw after three days, had been tussling with a fellow workman, when he was struck in the abdomen by the knee of the other man. He went to a doctor's office and after casual examination was sent home without a diagnosis. One day later he was quite ill and sent for another doctor who treated him two days before calling consultation. The consultant ordered him to the hospital at once, and when he arrived he was operated on immediately. The abdomen was full of fluid and coarse undigested food, from a tear in the jejunum about one inch long. This man died of peritonitis which could and should have been prevented.

The chief thing for us to consider, as industrial surgeons, is that such cases are not rare, and we can not too strongly urge a careful watching, and frequent examinations of any patient that has suffered an injury to the abdomen. The diagnosis in these cases must be made on the history and *early* clinical signs, if the patient is to have a fair show for his life.

The literature gives symptoms that, if waited for, will be followed by death, even if operation is done. Hence, we must re-model our ideas of the clinical picture which presents. Most writers stress rapid pulse, temperature, abdominal facies, absent liver dulness and severe shock among the symptoms. These are symptoms of severe hemorrhage or peritonitis. The patient should be operated on before getting into this condition. The history usually shows that the man has had a blow on the abdomen, has been squeezed through the body, has been run over by a vehicle, or has had a fall upon the abdomen.

I saw two cases, in which the patient fell, striking on the abdomen. One fell off a car, and the other fell over a fence. Both suffered large tears in the bowel. Another man merely slipped while standing up in a horse cart, striking the front of his abdomen against the front of the body of the cart. He had a tear in the ileum two inches long. The violence is often seemingly slight and hardly worth considering.

The SYMPTOMS must be considered from the standpoint of those that may be observed early, because here is a condition in which the diagnosis must be made early in justice to the patient. Consequently, to my mind there are only five symptoms of first importance that should be looked for in these patients. There are a few others which have bearing on the case, and may aid in its interpretation. I will take these up in the order of their importance.

(1) *Transmission of heart and respiratory sounds*, so that they may be heard all over the abdomen. This sign may be absent in severe injury and may be present with a fairly slight amount of trauma in the abdomen, with a small hemorrhage. If it is present and well marked, there is always accompanying injury; and it of itself is a strong indication for exploring the abdomen.

(2) *The Silent Abdomen.* The entire absence of peristaltic sounds always means trouble, but we may have very active sounds with severe injury, at times. If the patient has had morphine, this may lessen peristalsis, but will never obliterate all sounds.

(3) *Tenderness.* This of course, may come from muscular contusion but, if marked, localized and elicited by firm rather than light pressure, the inner organs are probably its source; and its location is a fair indication of the point of injury, as a rule.

(4) *Rigidity.* This may be present or absent. If present, it may mean contusion of the abdominal wall, but in that case it is not marked and is not accompanied by the transmission sign, or the silent abdomen. The history will help in the decision.

(5) *Vomiting.* This usually occurs until the stomach is emptied. It is then absent, until peritonitis induces late vomiting. The vomited material is usually ordinary stomach contents, though in some cases, when the contusion is high up and severe, it may contain blood. Usually, when blood is vomited, if a careful examination is made, a concomitant injury of the mouth or pharynx will be demonstrated, the blood having been swallowed.

These five symptoms, to my mind, are the

most important, in arriving at a diagnosis. While pain may be a help, it is rather unreliable, except as taken in consideration with the foregoing.

Dr. S. S. Gale, of Roanoke, Va., suggested that a blood count is of great value. In cases where there is severe internal hemorrhage, we would get a high white, and a low red count. This may at times be of great assistance, but many of the cases of bowel rupture show practically no hemorrhage at all. It is possible to have quite a dangerous injury with no blood reaction, until some hours allowed the development of peritonitis, followed by leucocytosis.

The bladder in all cases should be catheterized to exclude rupture or a tear in the urethra.

THE DIAGNOSIS. This must be made early and we must arrive at our decision through a consideration of those symptoms that arise early. We must remember that the early symptoms, whatever the injury, are due solely to the irritation of the peritoneum by fluid contents of a hollow organ, or the outpouring of blood into the free cavity.

First the history. Did he get a fall? Was he squeezed in a close place? Did he have a blow on the abdomen, or was he run over by a vehicle? Did he vomit; if so, how often and how soon after the injury? What was the nature of the vomitus?

This, followed by a careful auscultation and palpation of the abdomen, will give us as good an insight into the case as we can get.

If he has either the silent abdomen, or the transmission sign with rigidity, or tenderness, and the history is such, as to lead to a strong suspicion of visceral injury, then I feel that it is right to make a tentative diagnosis of visceral injury; and exploration should be done.

If there is strong doubt as to visceral injury, then the man should be placed in a hospital under careful watching. He should be seen by the doctor hourly, until he feels assured that there is no injury to the organs.

I do not mean to advocate promiscuous opening of the abdomen; but I do feel that too many men are allowed to die annually, while the attendant is waiting the development of symptoms which will assure the diagnosis. When conditions justify an assured diagnosis, it is often too late to operate, and the dire prediction so often seen in the newspapers, "Mr. Jones, injured internally, will die," is promptly fulfilled.

I have opened two men that showed no special injury (except small bleeding) that would have caused any serious trouble if left alone. I feel that no injustice was done these men. They had other injuries that complicated the findings.

In operating on these patients, one must be prepared to do anything, from plain packing, or ligation of a bleeding point, to a re-section of the bowel, or nephrectomy. I feel that we can never be more explicit in our diagnosis, than that some internal organ is injured.

Riverside Building.

TRACHEOTOMY; IMPROVED TECHNIQUE.

By ELBYRNE G. GILL, M. D., Roanoke, Virginia.

There are times when all laryngologists are called upon to perform a tracheotomy in cases when intubation will not answer:

(1) When intubation tubes are not available or their use is not understood.

(2) In excessive edema of the larynx when the intubation tube does not relieve.

(3) When the membrane is in the lower tracheal track.

The accidents which may be incident to this operation are:

(a) Failure to open the trachea, especially in very fat children.

(b) Severe hemorrhage when the incision is carried too far to either side.

(c) Irregular incision making it difficult to introduce cannula.

(d) Asphyxiation from blood escaping into the trachea.

(e) Asphyxiation from collapse of the trachea.

(f) Septic pneumonia or lung abscess caused by the escape of blood and infected material into the trachea and bronchi.

The above complications can be avoided, also the haste in performing the operation can be obviated, by employing the following technique:

1st. Before performing the operation, introduce the bronchoscope and allow it to remain in the trachea and bronchus until the operation has been completed.

All that is necessary in employing this technique is to be equipped with one broncho-

scope, one laryngoscope and a pocket battery, with its connections. A competent laryngologist should be able to expose the larynx and introduce the bronchoscope in one minute's time.

When the bronchoscope is once introduced, there will be no need for undue haste in performing the tracheotomy as the patient will have been provided ample breathing space and the operator will have a firm land mark to follow in cutting down on the tracheal rings. After the incision has been made through the tracheal rings and all bleeding controlled, the operator can then remove the bronchoscope to the point of the incision and then introduce the tracheal cannula and this completes the operation.

The incision should be made low, following the method described by Jackson. If this is done, a tracheotomy will be performed and not a laryngotomy.

As far as the writer has been able to learn this technique is not being employed and has not been mentioned in any recent text book on laryngology.

612 *MacBain Building.*

THE IMPORTANCE OF THE GLANDULAR SYSTEM AND A PLEA FOR THE PRESERVATION OF THE TONSILS.*

By J. E. COPELAND, M. D., Round Hill, Va.

The glands of the human body perform an important part in its economy, but the functions of the great majority of its six hundred glands is shrouded in mystery and a knowledge of their physiological actions is often discovered only by the effect of some pathological condition of their structure. The functions of the glands afford a wide field for the physiologist and clinician and the most imaginative theorist has scarcely dreamed of their agencies in the development of the human body and the importance of their maintenance of it in health. While glandular therapy has received considerable attention, many discoveries have, unfortunately, been utilized by drug mongers who exploit their products for profit. Nevertheless, there is efficacy in a number of glandular preparations, if properly administered.

Recently we read that an eminent investigator claims that a criminal tendency is caused by diseased glands. We are all familiar with the fact that, in certain diseased conditions of the glands, other remote glands of the body with which no anatomical connection can be, or at least, never has been demonstrated, are seriously affected. For instance, parotitis when confined to its original habitat, the parotid gland, is more or less mild and, so far as is known, a harmless disease, but when in its course a metastasis supervenes, which is not an infrequent occurrence, grave and irreparable injury to the procreative organs of the male results and in this event the testes become involved, epididimitis occurs, the spermatic cord is obliterated, or at least its function is impaired, and sterility results. In females a metastasis affects the mammary glands and, if the subject be a nursing woman, the milk dries up and the glands cease to function. Normally, the thymus gland atrophies at puberty, but if from faulty metabolism it retains its original size or increase in bulk, we find enlarged bones, muscles of the face, hands and other parts of the body, which condition is known as acromegalia. Just here we can not refrain from a digression to remark that the phrase "faulty metabolism" is a very valuable acquisition to the vocabulary of the physician and that we should thank the inventor for its coinage and that he claims no patent right on its use, as it serves to conceal our ignorance and often satisfies our patient's curiosity. If the thyroid gland atrophy, myxœdema with its attendant tremors, œdema, leucosis and, in the female, suppression of the menses, results. On the contrary, if the thyroid gland enlarge, we have exophthalmic goitre, protrusion of the eye balls and tachycardia with all their attendant evils. In Hodgkin's disease, we have hypertrophy of the lymphatic glands of the body due to the growth in them of adenoid tissue, which, if the patient survive a sufficient time, extends to other glands, notably the liver, spleen and kidneys, accompanied by anaemia, emaciation and death. If the suprarenal glands atrophy, we have Addison's disease with its bronzed skin, weakness and death. The eminent physiologist, Brown-Sequard, who was a Professor in the Medical College of Virginia, first demonstrated that by irritating the diminutive pituitary gland with "a bare bodkin," produced polyuria. In addition to the above, we might adduce more examples, but these should suffice to invite attention to the im-

*Read before The Loudoun County, Virginia, Medical Society, November 7, 1922.

portant and, in many cases, the indispensable part that the glands exercise in the growth and health of human beings and also of the lower animals.

In February and March 1880, an endemic of follicular pharyngitis in many cases of which the tonsils were involved prevailed over a radius of five or six or more miles that included Rectortown (at which place I was at that time located) and Delaplane and a portion of the Cobbler Mountain in Fauquier County, Virginia. The following summer a young doctor located at Delaphane and, like most young doctors, he had a poorly equipped armamentarium, but was the proud possessor of a tonsillotome which he used indiscriminately on numbers of persons whose tonsils were enlarged from the endemic of the previous winter. I advised my patients against the operation. Previous to the endemic I read in *The Hospital Gazette* a lecture by an eminent professor in New York, on follicular pharyngitis and tonsillitis, in which he condemned tonsillotomy as rendering the patient sterile. I have ever since that time (nigh unto one-half of a century) watched the effects of tonsillotomy and can give many instances that have come within my cognizance, of this result of the operation. I need not particularize but will mention one instance that will serve as an example. Several men were present in a store at Oak Hill within the bounds of this endemic. One of them remarked that a son of a neighbor had tonsillitis. Another remarked that he should have his tonsils cut out and asked my opinion of the operation. I hesitated but finally replied in plain language that it would render him incompetent to fulfil the Scriptural injunction to "Be fruitful and multiply and replenish the earth." My assertion caused some confusion which I ascertained was occasioned by the fact that three of the men who were present had had their tonsils removed, had subsequently married and, after a lapse of several years, their wives had not become pregnant. Similar cases were mentioned by others who were present. Of course, as in the case of the ovaries, if a portion of the tonsil be left intact it may continue to function. The fact that after the menopause is established the tonsils atrophy and no remains of the tonsil can be recognized proves that there exists some connection between the function of menstruation and the tonsils.

Tonsillitis is evidently connected with a rheumatic diathesis which develops during the gormandizing period of childhood and youth and later, from similar or other causes, manifests itself in rheumatism or gout. The treatment of the one is applicable to the other. Give salicylate of sodium and colchicum. In young girls tonsillitis is often complicated with some menstrual disturbance. In these cases give guiacum.

On October 6, 1922, Charles E. Page, M. D., Boston, Mass., writes that "Dr. John N. Mackenzie, a distinguished physician, a throat specialist and professor in Johns Hopkins University, in an address declared that the operation on the tonsils is 'a surgical insanity' and gave his reasons in detail, the chief point being that the tonsils are very important and useful organs and that there is no more occasion for the removal of an inflamed tonsil than an inflamed eye."

Tonsillitis is an affection peculiar to childhood and adolescence and frequently to newly married people and generally in time vanishes, as it were, of its own volition. If, however, pus supervene and enlargement persist, lance and drain it as you would an abscess of any other part of the body, but leave intact as much as possible of the stroma on which depends the secretion and function of the glands and which is undoubtedly connected with the procreation of the species. I am aware that this assertion is contrary to the opinion and practice of physicians generally, but let them watch the effects of tonsillotomy and they will or should cease to emasculate the innocent, helpless and confiding children and will teach parents the steriizing result of this deleterious practice.

Railroads grant reduced rates to our meeting in Roanoke. It is necessary that each member secure from the office of the State Society a certificate establishing his membership. This privilege will not be granted again unless our members generally use it.

Proceedings of Societies

The Nelson County Medical Society,

At its regular meeting in July, elected Dr. H. G. Dickie, Massies Mill, president for the ensuing year, and re-elected Dr. J. F. Thaxton, Tye River, secretary-treasurer. Dr. J. B. Woodson, Lowesville, was elected delegate to the Roanoke meeting of the Medical Society of Virginia, and Dr. D. C. Wills, Arrington, was elected alternate.

The Society held a special meeting August 13th, for the discussion of the Schick test and the administration of toxin-antitoxin in the prevention of diphtheria. Dr. George Payne, of the State Board of Health, was present at this meeting and gave a demonstration of the test and also administered the toxin-antitoxin to several of the Lovingston school children. Dr. Payne was also present at another meeting August 20th, at which time the results of the Schick test were observed.

The Society will meet again the fourth Monday in September.

J. F. THAXTON, *Secretary.*

Secretary's Announcement.

Reduced Railroad Rates to the Meeting in Roanoke.

As a result of much hard work on the part of Dr. J. Beverly DeShazo, of Ridgeway, Virginia, the railroads have granted reduced rates on the certificate plan for our meeting in Roanoke. Members may secure from the office of the Society a certificate which on presentation to ticket agents will enable them to purchase round trip tickets for themselves and dependent members of their families at one and one-half regular fares. Last year we did not comply with the requirements of the companies as to the number using the certificates. *It is essential that every member who attends get one of the certificates. A postal request is all that is necessary. We are so anxious to get them to the members that we pay the postage and provide the envelopes.* If you find later that you are not going, possession of the certificate will do you no harm. *If we do not get 250 members to use the certificates this year the privilege will be withdrawn and in the future our members will invariably pay full fare.* One certificate is all that is necessary for a member and any number of dependents who may accompany him.

The U. S. Civil Service Commission,

Washington, D. C., announces that applications will be received until December 28 for Junior Medical Officer, to fill vacancies in the Indian Service. Competitors will not be required to report for examination, but will be rated on their education, training, and experience. Full information and application blanks may be secured from the above named Commission.

Book Announcements

Practical Dietetics. With Reference to Diet in Health and Disease. By ALIDA FRANCES PATTEE, Graduate, Department of Household Arts, State Normal School, Framingham, Mass. Former Instructor in Dietetics, Bellevue Training School for Nurses, Bellevue Hospital, New York, etc. Fourteenth Edition. Completely Revised. A. F. Pattee, Publisher. Mount Vernon, New York. 1923. 12mo. Cloth. 687 pages. Price $2.60 net, postpaid ("Teacher's Dietetic Guide," covering State Board Requirements and Examination Questions in Dietetics given gratis with each copy of Practical Dietetics"). With Pattee's Hand Bag Diet Book, $3.20 postpaid.

Healthy Life. A Contribution to the Growing Boy Problem, by EDWIN M. HIRSCH, M. D., Clinical Instructor, Loyola University Medical School. With a foreword by BERNARD C. ROLOFF, Supt. Ill. Social Hygiene League. Introduction by LEE ALEXANDER STONE, M. D. The Solar Press, 209 South State Street, Chicago, Ill. 1923. Paper. 24 pages. Pamphlet on social hygiene for boys and young men from 14 to 20. Price, 25c per copy. Liberal reduction in lots.

Practical Medicine Series. Comprising Eight Volumes on the Year's Progress in Medicine and Surgery. Under general editorial charge of CHARLES L. MIX, A. M., M. D. Volume I. **General Medicine.** Edited by GEORGE H. WEAVER, M. D., LAWRASON BROWN, M. D., ROBERT B. PREBLE, A. M., M. D., BERTRAM W. SIPPY, M. D., and RALPH C. BROWN, B. S., M. D. Series 1923. Chicago. The Year Book Publishers, 304 South Dearborn Street. 12mo. 678 pages. Cloth.

A Clinical Guide to Bedside Examination. By DR. H. ELIAS, Dozent and Assistant at the First Medical Clinic of University of Vienna, Austria, etc. Arranged and translated by WM. A. BRAMS, M. D., Chicago, Ill. Adjunct in Medicine, Michael Reese Hospital, etc. New York. Rebman Company. 12mo. 135 pages. Cloth. Price $1.50.

Virginia Medical Monthly

FOUNDED BY LANDON B. EDWARDS, M. D., APRIL, 1874.
OWNED BY THE MEDICAL SOCIETY OF VIRGINIA.
PUBLISHED BY THE PUBLISHING COMMITTEE.

A. G. BROWN, Jr., M. D., Chairman, Richmond, Va.
B. R. TUCKER, M. D., Richmond, Va.
P. W. HOWLE, M. D., Richmond, Va.
E. L. KENDIG, M. D., Victoria, Va.
A. L. GRAY, M. D., Richmond, Va.
ALEX. G. BROWN, Jr., M. D., Editor.
G. H. WINFREY, Business Manager and Secretary-Treasurer.
AGNES V. EDWARDS, Editor's Assistant and Assistant Manager.

All correspondence regarding editorial matters, articles, advertisements, subscription rates, etc., should be addressed to the Journal.

All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.

Subscription Price: $2.00 per annum in advance.
Single Copies 20c.

Vol. 50 SEPTEMBER, 1923 No. 6

Editorial

Insulin in Juvenile Diabetes.

A sick child appeals to every one, the world over. The scientific development of pediatrics within the last score of years has done much to lessen illness and death among the children of civilized countries. Infants now receive a more balanced ration. The infant's food, whether breast-fed or non-breast-fed, is more carefully managed and administered. The protection of milk from bacterial changes, the proper modification and balancing of infant feeding, the hygienic and physical control of the environment and bodies of infants has done a large part in reducing the high incidence of acute illness and mortality among children. Besides, from infancy through juvenile years, greater scientific care is now exercised in feeding, in weighing and measuring, in eliminating sources of infection such as infected tonsils and teeth, in searching for and correcting constitutional diseases such as tuberculosis, and in righting and adjusting physical deformities in the years of growth and development.

All of these accomplishments have heartened and brightened every one as these vast improvements in child growth and child physical culture have been observed during the past decade. But in the midst of the optimistic view of the great advances in this field, one dark spot, juvenile diabetes, has persistently remained. While the progress in and success of the fight against the diseases of infancy and childhood has been won in many diseases, the ominous disease of diabetes, yet casts its long shadow across the path of childhood, for juvenile diabetes has usually been fatal.

Is insulin to change this? One may read Geyelin's* paper and take hope. The paper is based on the observations made of nine children from two to sixteen years of age. The type of diabetes in each one of his cases was severe. The inherent progress of these cases seemed to be in keeping with the type, being progressively worse. In the nine, and in thirty odd additional cases, there have been no therapeutic failures. In the group of cases forming the basis of the report under review, there was

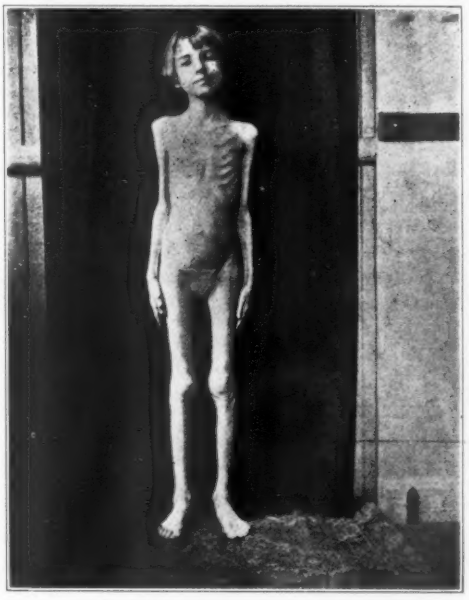


Fig. 1.
Geyelin's case before insulin.

a definite and continuous gain of weight. The gain in weight in his cases varied, but it was present. The gain was, of course, influenced by (1) length of time patient was under treatment and control, (2) age and original weight and condition of the child, (3) the amount of insulin and amount of food given. The gain of weight in the group ranged from two pounds in three months to twenty-two pounds in seven months. In this connection there was observed a commensurate increase in muscular strength and physical vigor, and also in mental well being. In addition to this, there was

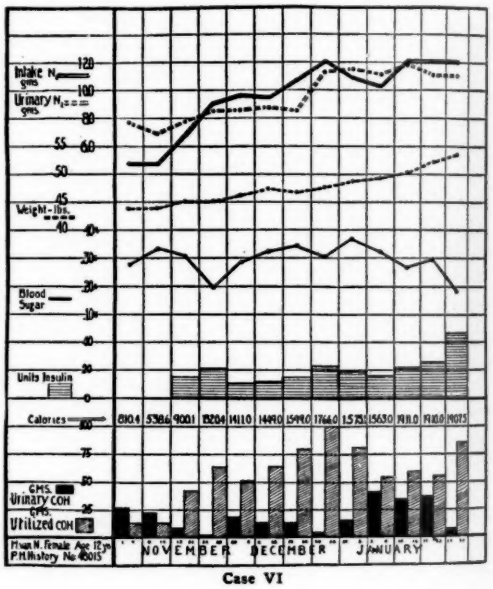
*"The Use of Insulin in Juvenile Diabetes." The Jour. of Metabolic Research. Nov.-Dec. 1922, p. 767.

noted a definite increase in the carbohydrate tolerance, varying with severity of the case and amount of insulin given. Insulin treatment and diet adjustment seemed to arrest the downward course of the disease. Let us quote Geyelin, Case VI, for it has an effective lesson to teach:

"Case VI. M. V. N. Age 12 years. Presbyterian Hospital History No. 48015. Date of onset: (1) By symptoms—October 24, 1920. (2) By urine analysis—November 5, 1920. Followed since November 8, 1920.

History and Summary of Pre-Insulin Course: Grandmother a diabetic. Patient was a normal, healthy child, whose best weight at 12 years was 57½ pounds. Onset of diabetes was sudden, two weeks before her admission to the hospital. Polyuria was first noted, two days later polydipsia and polyphagia began. She lost four pounds in two weeks. Glycosuria was discovered, three days before admission, by a local doctor, who put her on a diet high in fat and low in carbohydrate. On the second day of this diet she became drowsy, was nauseated, and vomited. On admission she was drowsy, but could be roused. Cheeks were flushed, lips very red, tongue dry, eyeballs soft, heart rapid, breathing very deep with acetone odor to breath. Examination was otherwise negative. She weighed 53.5 pounds. Her fluids were forced to 3,000 cc. per day. She was given sodium bicarbonate, 26 gm., and put on a diet of carbohydrate, 70 gm., protein, 30 gm., fat, 0 gm. for 3 days. Blood CO_2 rose from 10.9 volumes per cent to 57.6 volumes per cent. Blood sugar remained at 0.380 per cent. There was great clinical improvement. Urinary sugar disappeared after a day on carbohydrate, 30 gm., protein, 10 gm., fat, 0 gm. and one day on carbohydrate, 10 gm., protein, 10 gm., fat 0 gm. After one complete fast day, the diet was gradually raised to carbohydrate 80 gm., protein, 24 gm., fat, 10 gm., before sugar reappeared. She was discharged after one month, sugar-free on carbohydrate, 30 gm., protein, 50 gm., fat, 60 gm.

She was treated in the out-patient department, and was sugar-free for the next eight months, on a diet which was gradually raised to carbohydrate, 50 gm., protein, 65 gm., fat, 110 gm. Her weight rose to 56.5 pounds. Two blood sugars during this period were normal. Toward the end of this time (August 1921), her tolerance began to fall, until, one year after onset (November 1921), she showed sugar on carbohydrate, 20 gm., protein, 35 gm., fat, 35 gm., and was sugar-free on carbohydrate 10 gm., protein, 25 gm., fat, 25 gm. Acetone was always present in the urine from about this time on. In November 1921, she had a tooth extracted, which proved to have a pus sac at the root, and during the next few months she suffered from frequent colds. In the first six months of her second year she was kept on a gradually decreasing diet with frequent fast days, and was admitted to the hospital in May 1922, showing sugar on carbohydrate, 20 gm., protein, 20 gm., fat, 50 gm. Physical examination was negative, weight 46 pounds, blood



Case VI

sugar 0.298 per cent. On a diet of carbohydrate, 14 gm., protein, 20 gm., fat, 90 gm., her daily urinary glucose averaged 28 gm. Her carbohydrate was cut to 7 gm. with no effect on the glycosuria. She was then put on carbohydrate 0 gm., protein, 20 gm., fat, 20 gm., on which she became practically sugar-free after six days. She was kept on this for 14 days in all, and then remained sugar-free for 5 days on carbohydrate, 5 gm., protein, 20 gm., fat, 30 gm., but began to show sugar on carbohydrate, 5 gm., protein, 30 gm., fat, 35 gm., and continued to show a daily output of 20 to 30 gm. of sugar on carbohydrate, 6 gm., protein, 25 gm., fat, 50 gm. She was discharged on carbohydrate 5 gm., protein, 25 gm., fat, 60

gm., weighing 51.75 pounds, and in the next two months showed only a trace of sugar most of the time though her diet was raised to carbohydrate, 7 gm., protein, 30 gm., fat, 65 gm. It should be noted that her urinary volume during this time was very large.

Third admission October 31, 1922, for insulin therapy. During a control period of two weeks before insulin was started, daily urinary sugar averaged 25.6 gm. on a diet affording 39.15 gm. available carbohydrate, with average daily nitrogen loss of 2.6 gm. This made the utilized carbohydrate 13.6 gm. Blood sugar averaged 0.297 per cent and blood CO_2 48.7 volumes per cent. Weight was constant at 44 pounds. Basal metabolism—38 per cent.

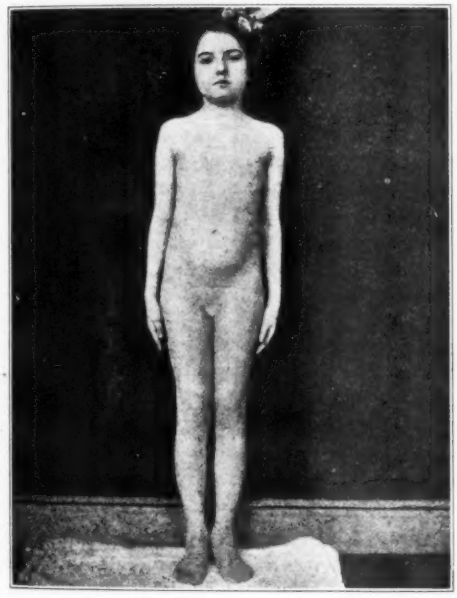


Fig 2
Same case four months after insulin.

Average urinary volume was 5,000 cc. with consequent great loss of heat. Clinical condition was characterized by extreme weakness and lethargy.

Course under Insulin Therapy: Chart shows increase in weight and carbohydrate utilization coincident with insulin therapy. Positive nitrogen balance is attained. The maximum insulin effect is seen at the end of the second month, and is followed by three weeks of relatively delayed progress, with return to negative nitrogen balance. The gain in weight was uninterrupted and was not accounted for by fluid retention. During this period, on account of shortages in supply, insulin therapy was several times interrupted for a day or two at a time. Over the period covered by the chart gain in height was about 3 cm. Distribution in diet of carbohydrate, protein, and fat in last three weeks of chart was, carbohydrate, 50 gm., protein, 75 gm., fat, 150 gm.

Abscesses at site of injection: None.

Independent infections: January 22, acute pharyngitis and cervical adenitis. January 25, maxillary sinusitis: antrum opened, found to contain pus, and irrigated daily from January 25 to February 9.

Serum sickness: None.

Insulin shock: None."

Allen and Sherrill's* summary and conclusions on Insulin are:

"1. All of the 79 cases of uncomplicated diabetes in this series have responded favorably to treatment with insulin. There has been only one death, due to flagrant disregard of diet. The increases of diet, weight and strength made possible by the new treatment even in the severest cases are beyond comparison with anything possible under any other known method.

2. Of 9 coma patients treated with insulin, 5 died and 4 recovered. All or nearly all of these cases were evidently hopeless with ordinary treatment, and the saving of lives can be directly credited to the insulin. In most of the unsuccessful cases insulin reduced or abolished glycosuria and ketosis, and the reasons for death under these circumstances are still hypothetical. The necessary dosage in coma cases may run into hundreds of units in 24 hours, the possible limits of safety or usefulness being as yet undetermined. All the measures formerly in use, together with somewhat more glucose or carbohydrate than formerly customary, should be used as adjuvants to insulin.

3. Among 14 cases complicated by local or general infections, there have been 5 deaths and 9 survivals. The higher nutritive level made possible by insulin promises to be especially important for cases of diabetes with tuberculosis. For other medical and surgical infections, notably gangrene, insulin is extremely helpful for bringing glycosuria and other symptoms under control more rapidly and thoroughly than otherwise possible while

*Journal of Metabolic Research. Nov.-Dec. 1922.

obviating the necessity of extreme undernutrition. The limited experience seems to indicate that moderate undernutrition is still beneficial to such cases in conjunction with insulin, at least during the period of chief danger. Emphasis should be placed upon thorough control of the diabetes rather than upon high nutrition. The general resistance and the healing of wounds are no better under insulin than they have been under efficient dietary control heretofore. The incidence of respiratory and other minor infections is perhaps slightly higher than under the former strict undernutrition treatment. The lowering of tolerance which has long been familiar under diet treatment is now represented by an increase of the insulin requirement during infections.

4. We have followed the general principle that treatment should keep the urine normal and the blood as nearly normal as possible. It is seldom feasible with the present methods of using insulin to keep the blood sugar as rigidly normal as with diet alone, especially in severe cases, because of the danger of hypoglycemia, but with care this ideal can be rather closely approximated. All our attempts with lax or inaccurate diets in conjunction with insulin treatment have led to disastrous results. Thorough training regarding the use of both diet and insulin should be given, preferably in an institution, to all patients before they attempt the management of their condition away from direct supervision. After such training patients have proved able to continue the treatment successfully at home, and the average standard of fidelity has been higher than before. *Insulin has tremendously improved diabetic treatment, but has not simplified it.*

5. The occurrence, symptoms and treatment of hypoglycemia, as described by the Toronto investigators, have been confirmed. The avoidance of danger from this cause is ordinarily a simple matter both in an institution and for well trained patients in their homes.

6. Our general standards of nutrition have been, for growing children ample diets for their development, and for adults enough to keep them a few pounds below their original or normal weight and to make them comfortable and fit to work. While gross excesses of carbohydrate are avoided, the diets are nevertheless of agreeable mixed character, and are planned not in conformity with any fixed rule but rather to suit the empirical needs of each individual case in respect to both composition and total caloric value.

7. The insulin dosage necessary for control of symptoms under the above conditions has ranged between the extremes of 4 units and 70 units per day in different cases. The requirements vary with the severity, the total diet, the body weight, and other known and unknown factors. Our dosage also has been individualized to suit each case, as we believe that all rules based on the glucose value of the diet or any other principle yet known are widely fallacious.

8. Exercise seemed to accomplish an increased utilization of sugar in three cases under insulin treatment, as formerly known under diet treatment. The influence in this direction is only slight, and the chief practical importance of the observations lies in the warning that heavy exertion may increase the danger of hypoglycemia in certain cases.

9. Insulin showed no perceptible influence upon non-diabetic conditions such as kidney disease, cirrhosis of the liver, or neurasthenia.

10. In 3 cases, diabetics seemed to lose tolerance demonstrably when glycosuria was permitted with insulin treatment. Several other patients have shown gain of assimilative power with insulin beyond anything that could be expected with diet alone. There seems to be no chance of real cure unless possibly in certain mild or incipient cases, with which the trials are still in progress. On the whole, when allowance is made for accidental or modifying factors, the insulin requirement of most cases remains fairly constant and the patients return to their former condition if insulin is withdrawn. These observations at least encourage the hope that downward progress can be arrested by suitable use of insulin, and they therefore add support to the theory that functional over-strain is the essential cause of the progressiveness of diabetes.

From a practical standpoint, three points seem worthy of emphasis by repetition. *It is feasible for patients at their homes to remain free from glycosuria and nearly free from hyperglycemia under combined treatment by diet and insulin. Over-nutrition makes freedom from glycosuria difficult, and exposes to acidosis, infection and other dangers. Insulin is a literally epoch-making discovery, which revolu-*

tionizes the results of diabetic treatment when properly employed, but it cannot atone for lax or inaccurate dietary methods."

Williams'* Conclusions are:

"1. In the study of any remedy for the treatment of diabetes, the significance of dietary control must be thoroughly evaluated, because with proper regulation diabetics may gain and maintain to a very considerable degree the ability to utilize glucose.

2. It requires from 2 to 4 weeks of careful observation and dieting to determine approximately the maximum diet which will enable a diabetic to maintain a normal blood sugar level and urine free from glucose.

3. If proper dietary control be continued, the diabetic may gain slightly in food tolerance over a period of a year or more or he may decline with more or less rapidity in that time.

4. Because of the foregoing facts, it is difficult to measure with precision the value of insulin in diabetes.

5. A series of 44 cases were studied over periods of time varying from 20 to 250 days. Of these 37 were unusually severe, nine cases being in coma when treatment was begun. The food tolerance of 34 cases had been carefully determined by previous study.

6. Four deaths have occurred. Two of these can be directly attributed to insufficient insulin, and two were from causes unrelated to the diabetes.

7. The 40 living cases have gotten along with far greater comfort and strength than was experienced before the institution of the insulin treatment.

8. The feeding of high diets and attempting to make their utilization possible by large doses of insulin has not been satisfactory.

9. The best treatment, apparently, is a diet which will enable the patient to meet the energy requirements of light work with sufficient insulin to insure the metabolism of the food.

10. Time and frequency of dosage are important. Apparently the action of extract lasts only for a few hours. In severe cases it should be administered at least twice and better three times a day in properly spaced doses.

11. To prevent reactions a higher blood sugar level should be permitted than is customary when extract treatment is not employed.

12. The first effect of insulin apparently is to cause the storage of glucose. Later it may in part be burned. During the night glucose appears to be released from the tissues, leading to a high morning blood sugar and often urinary sugar.

13. Diabetic patients receiving insulin treatment experience a noteworthy gain in strength and well-being which suggests that the body is served in other ways than in the improvement in carbohydrate metabolism.

14. Experience to date does not warrant the conclusion that the natural function of the pancreas in cases of severe diabetes is either increased, regenerated or diminished because of the use of the extract."

*Journal of Metabolic Research. Nov.-Dec 1922.

Write to office of Medical Society of Virginia, Richmond, for your certificate entitling you to reduced railroad fare to the Roanoke meeting. A postal card request is all that is necessary.

News Notes

Roanoke Meeting, Medical Society of Virginia.

Supplementing a former announcement relative to the golf tournament, it is now definitely planned to play a handicap of thirty-six holes. The tournament will begin at 10 A. M. Tuesday, the opening day of the meeting, and an exciting contest is anticipated. Up to the present twenty-three members have signified their intentions of taking part in the handicap, and it is planned that cars will leave Hotel Roanoke about nine-thirty for the Country Club, and that eighteen holes will be played in the forenoon, after which luncheon will be served at the Club, and the remaining eighteen holes will be played in the afternoon. The awarding of the cup will take place at one of the social functions later on during the meeting. It should be borne in mind that since the tournament will take place in the forenoon and early afternoon, the regular program will not in any way be encroached upon.

By the way of a reminder, stickers for use upon mailing matter have been arranged for by the Committee in charge, and a supply will be gladly furnished to those who wish to ex-

hibit and to all others interested in developing a good attendance at the meeting.

The Chairman of the Exhibit Committee announces that the demand for space has been very active and that the exhibits promise to be unusually attractive from every standpoint. The exhibit room is conveniently located, well lighted, and an inspection of the list of exhibitors shows them to be such as will guarantee that the latest and best will be shown in drugs, books, instruments and appliances.

The scientific program promises papers on many interesting subjects, in addition to those in the general symposium on "The Pancreas." Dr. Seale Harris, Birmingham, Ala., and Dr. E. P. Joslin, Boston, have accepted invitations from the president, Dr. J. S. Davis, to attend and present papers. Other visitors may be named at a later date.

In addition to the golf tournament, automobile rides and other entertainments have been arranged for members and the ladies accompanying them.

Be sure to write this office to secure your certificate to enable you to have reduced railroad fare.

Ladies—Attention!

The ladies of the Auxiliary to the Medical Society of Virginia are invited to attend the State Convention which meets in Roanoke, October 16-19. A large attendance is earnestly requested as a great many matters of importance are to be decided at this meeting. Roanoke is putting forward every effort to give us a royal welcome. It is necessary to have a "get together" for exchange of ideas, to enable us to have a successful organization and vie with our sister states. A great pleasure is in store, as the new president-elect of the National organization, Mrs. J. Allison Hodges, of Richmond, will attend.

In March, notices were sent to the different counties to organize and to notify the State Secretary, Mrs. Burnley Lankford, that they had received the notices and had organized. Very few have given the desired information. At your earliest convenience, please send the names of your organizations, officers, and also delegates who will attend the Roanoke meeting to the State Secretary, Mrs. Burnley Lankford, 530 Shirley Avenue, Norfolk, Va.

It is very important to have this information at an early date in order to form plans for the convention and to give the Roanoke ladies an idea of the number who expect to attend.

Mrs. R. Lloyd Williams, *State President.*

Woman's Auxiliary, Medical Society of Virginia.

The above notice to doctors' wives and daughters is self explanatory. At the meeting in Norfolk, last year, the Woman's Auxiliary to the Medical Society of Virginia was formed. The aim of the Auxiliary is to co-operate with the doctors of the State in their efforts "to educate the public in matters of sanitation and health; to assist in entertainment at State, district and county society meetings; to promote acquaintance among doctors' families, that local unity and harmony may be increased." These matters should be of interest to all ladies in members' families.

Won't you attend the Roanoke meeting and learn more of the Auxiliary's work?

Maternal Welfare Work in Virginia.

In a report recently issued by Dr. W. A. Plecker, State Registrar of Vital Statistics, it was stated that the largest number of sepsis deaths in Virginia during the past ten years was 191 in 1917. Since the placing of midwives of the State under the supervision of the State Registrar, there has been noted a saving of 40 to 50 mothers a year, though this may not be wholly the result of this legislation.

The work begun by the Bureau of Vital Statistics has been taken up by the Bureau of Child Welfare of the State Board of Health under the Sheppard-Towner Act of Congress, the expense being borne by that fund. Mrs. Emily Bennett, a Johns Hopkins nurse, has been placed in charge of this work and is developing it in a splendid manner, building upon the foundation laid by the Bureau of Vital Statistics and working in connection with it. She has been systematically carrying out the Bureau's system of midwife instruction, by courses of lectures given by herself, by county nurses, and by lectures and other forms of instructing mothers and prospective mothers.

The Bureau is anxious to help mothers by sending to all who will request it printed prenatal instructions and booklets. All women are urged to have good medical care.

The Gorgas Memorial.

The House of Delegates of the American Medical Association, at its San Francisco

meeting, by a standing vote endorsed the plan for the establishment of a memorial to General Gorgas, whose genius stamped out yellow fever in Cuba and Panama, and taught the control of these diseases. The memorial will take the form of a research laboratory and a teaching institute for tropical and preventive medicine, and will be located in Panama on a beautiful site on the Pacific shore, donated by the Republic, President Porras, and the citizens of Panama, who have guaranteed the initial building. This is to be known as the Gorgas Memorial Institute of Tropical and Preventive Medicine.

Dr. Franklin H. Martin, Chicago, is chairman of the executive committee, in charge of raising the funds necessary from this country.

Number of Virginians at Mayo Clinic.

It is interesting to note the large number of University of Virginia alumni, who are or were Virginians, who have been at Mayo Clinic, Rochester, Minn., this summer. These are: Dr. A. S. Moore, formerly of Aldie, and Dr. J. L. Crenshaw, formerly of Rapidan, both on the permanent staff; Dr. J. A. Wilkins, Lynchburg, and Dr. R. M. Gilliam, Petersburg, medical and surgical fellows on the Mayo Foundation, respectively; Drs. Wm. E. Bray and I. A. Bigger, University, who attended for the month of August; Dr. J. S. Horsley, Jr., Richmond, who returned the first of September after several weeks' work, and is connected with the surgical and gynecological department of St. Elizabeth's Hospital, Richmond; and Dr. L. M. Blackford, University, who graduated from the University of Virginia this June and, after a couple of months at the Mayo clinic, entered upon his duties as interne at Union Memorial Hospital, Baltimore, the first of this month.

Dr. and Mrs. W. L. Peple,

Richmond, are expected home the middle of this month, after spending several months touring the British Isles, France and Belgium.

Dr. and Mrs. James H. Smoot

And daughter have returned to their home in Woodstock, Va., after an extended visit to New York City, Niagara, Canada and Detroit.

Dr. and Mrs. B. W. Switzer,

Lexington, Va., recently enjoyed a visit to relatives at Rawley Springs, Va.

Married.

Dr. Elbyrne Grady Gill and Miss Ruth Meals, both of Roanoke, Va., June 16.

Dr. Mortimer Harry Williams, Roanoke, Va., and Miss Julia Mountcastle, Weldon, N. C., September 8.

Dr. Millard Bridgman Savage, Norfolk, Va., and Mrs. Esther Lenore Gregory, Washington, D. C., July 9.

Dr. Richard Lee Willis, formerly of Chatham, Va., a member of the class of '21, University of Virginia Medical School, and Miss Elizabeth Harris, of Crozet, Va. They will make their home in East Orange, New Jersey.

Dr. James Ernest Stokes and Miss Rebecca Marsh, both of Salisbury, N. C., June 28.

The Southern Medical Association

Is preparing for a big meeting in Washington, D. C., November 12-15, inclusive. Dr. Thomas A. Groover, 1621 Connecticut Avenue, N. W., is general chairman of the local committee; Dr. Philip S. Roy, 1200 Massachusetts Avenue, N. W., vice-general chairman; and Dr. William Cabell Moore, 1824 Massachusetts Avenue, N. W., general secretary. These or Mr. C. P. Loranz, secretary-manager of the Association, Empire Building, Birmingham, Ala., will be glad to give any necessary information.

Resident and Travel Scholarships for Physicians.

The American Child Health Association, 370 Seventh Avenue, New York City, has appropriated $10,000 for resident and travel scholarships to physicians. These scholarships are for the purpose of affording an opportunity to secure training in child health work which will better fit physicians to fill positions with state and municipal divisions of child health or organizations engaged in child health work, or to enable physicians already engaged in the child hygiene field to secure additional training or experience. The fund will be allotted in amounts suited to the objectives arranged for the respective students.

Applicants eligible for these scholarships will be physicians who are in good standing in their local and state medical societies and shall present evidence of the following qualifications:

(a) Graduation from a Grade A medical school and a license to practice in the state from which they apply.

(b) Real interest in child health.

(c) Either special instruction or practical experience in public health or child hygiene, including school health work. Those who have had such experience will be given preference in the selection of candidates.

These scholarships will be given during the school year of 1923-1924, and during the summer of 1924.

Application blanks and further information will be furnished on request to the American Child Health Association.

Dr. and Mrs. W. W. Bennett,

Blackstone, Va., spent a most enjoyable vacation on a motor trip through northern Virginia and Maryland.

Dr. Rufus L. Phipps,

Of Clintwood, Va., was quite seriously injured in an automobile wreck, the latter part of August. It is stated that his arm was broken and shoulder dislocated, in addition to bruises and cuts.

Dr. George H. Reese,

Petersburg, Va., left the middle of August for Rochester, Minn., where he is attending the Mayo Clinic for several weeks.

The American Roentgen Ray Society

Is holding its annual meeting in Chicago, with headquarters at Congress Hotel, September 18-21, inclusive. A number of eminent foreign contributors are scheduled for papers, and announcements indicate that treatment by high voltage X-ray will have a prominent place on the program.

Dr. William C. Powell,

Petersburg, Va., spent some time at Virginia Beach, the latter part of August, enjoying the pleasures of that resort.

Dr. T. E. Chapman,

Formerly of Norton, Va., and at one time president of the Wise County Medical Society, after spending several years in the far west to regain his health, has now located at Joplin, Mo., where he has taken up active practice again.

Dr. A. G. Brown, Jr.,

Has returned to his home in Richmond, after a pleasant vacation spent in the New England States. When in Boston, he had the pleasure of seeing many interesting and instructive cases in the medical wards of the Peter Bent Brigham Hospital.

The Tri-State District Medical Association,

Comprising the entire states of Iowa, Illinois, Wisconsin and Minnesota and districts of surrounding states, will have their annual assembly in Des Moines, Iowa, October 29, 30, 31 and November 1. Headquarters will be at Fort Des Moines Hotel. All physicians in this State who are in good standing in the State Society are most cordially invited to attend and take part in the program.

This association is a purely post-graduate organization and the entire time of the annual assembly is taken up with scientific study. A number of eminent members of the profession have accepted to take part in the program.

Dr. William B. Peck, Freeport, Ill., managing director, will give more detailed information upon request.

Dr. and Mrs. Stuart McGuire

Have returned to their home in Richmond, after a visit to Nova Scotia and other northern points of interest.

Dr. Basil B. Jones

Has returned to Richmond, and will open offices October 1st in the Medical Arts Building. His practice will be limited to diseases and nutritional problems of infancy and childhood.

Dr. Jones graduated at the Medical College of Virginia in 1916, and for four years did special work in pediatrics at the Boston Floating Hospital, Massachusetts General Hospital, and at the Kingston Avenune Contagious Hospital at Brooklyn. He has been in pediatric practice in Los Angeles, California, for the past two years.

Prizes to Members of Richmond Academy of Medicine and Surgery.

At a meeting of the Richmond Academy of Medicine and Surgery, last year, Dr. J. S. Horsley, of this city, announced that an anonymous friend had offered two prizes, the first, $100 and the second, $50 for the two best original papers read before the Academy during 1922. A committee of five was appointed to decide upon these awards, with the result that the first award was made to Dr. Joseph F. Geisinger for his paper on "Reduplication

of the Ureter" which was published in *Annals of Surgery*, May, 1923. The second prize was given Dr. Wyndham B. Blanton for his paper on "The Clinical Significance of Reductions in the White Cells of the Human Blood," published in VIRGINIA MEDICAL MONTHLY, April, 1923.

Dr. H. M. Snead,

South Hill, Va., is home again, after a visit to his mother at Fork Union, Va.

Dr. S. W. Maphis

Returned to his home in Warrenton, Va., recently, after a visit to Hot Springs, Va.

Dr. A. M. Showalter,

Cambria, Va., spent his vacation with friends on a camping trip in Maryland.

Dr. Fletcher D. Woodward

Has become associated with Dr. John W. C. Jones, Newport News, Va., and will limit his practice to diseases of the eye, ear, nose and throat. Dr. Woodward graduated from the University of Virginia in 1919, after which he served as an interne at University of Virginia Hospital. He completed a two and a half years' service at Manhattan Eye, Ear and Throat Hospital, New York City, prior to becoming associated with Dr. Jones.

Dr. E. W. Walker,

Recently of Exeter, Va., is now at Appalachia, Va.

Dr. J. J. Anderson,

Formerly of Irwin, Va., after spending some time traveling, has located in Richmond, with offices at 2200 Hanover Avenue. He will be engaged in general practice.

The Medical Association of the Valley of Virginia

Is to hold its next meeting in Staunton, September 27, at which time the election of officers will be held. Dr. Hunter McGuire, Winchester, is president, and Dr. Alex. F. Robertson, Jr., Staunton, secretary.

The Mary Elizabeth Hospital,

Raleigh, N. C., announces the association of Dr. Verne S. Caviness, practice limited to Diagnosis and Internal Medicine, and of Dr. Powell G. Fox, in the department of General Medicine.

Dr. and Mrs. Hunter B. Spencer

Have returned to their home in Lynchburg, Va., after a visit to Canada and Detroit, having returned from the latter place in their car.

Dr. and Mrs. A. J. Hurt

And daughter of Chester, Va., left the middle of August for an extended motor trip in New York and in the New England States.

Dr. Francis J. Ready,

Clarendon, Va., announces that he has moved his offices to 3301 N Street, Northwest, Washington, D. C., where he will continue in general practice.

Dr. Walter M. Babb,

Keyser, W. Va., has been elected president of the West Virginia State Board of Health.

Dr. Buckner M. Randolph,

Washington, D. C., having accepted an appointment as professor of clinical medicine and director of clinics in the Medical Department of George Washington University, Washington, announces that he has withdrawn from the general practice of medicine and will hereafter limit his private work to consultations and referred work. His offices will be at George Washington University Hospital, 1339 H Street, Northwest.

Dr. R. B. Gillespie,

Formerly of this State, but now with the Public Health Service, has been transferred to Tampa Bay Quarantine, Tampa, Florida.

Dr. R. A. McBrayer

Has resigned from the staff of the N. C. Tuberculosis Sanatorium and has located in Shelby, N. C., for the practice of internal medicine.

Dr. and Mrs. J. A. Riffe,

Covington, Va., were recent visitors in Richmond.

Dr. and Mrs. J. Weldon Smith

And daughter, Farmville, Va., spent their vacation on a motor trip through Eastern North and South Carolina.

Dr. and Mrs. Wade C. Payne,

Haymarket, Va., spent a short vacation with relatives in Fredericksburg, Va.

Dr. and Mrs. L. C. Shepherd

And daughter, of Norfolk, Va., spent some time in August visiting in Harrisonburg, Va.

Dr. Allison of St. Louis Goes to Harvard.

Dr. Nathaniel Allison, dean of Washington University Medical School, St. Louis, has resigned to accept the position as head of the department of othopedic surgery in the Medical School of Harvard University.

Dr. Turner S. Shelton

And family, of Richmond, have returned home after a motor trip through eastern Virginia and North Carolina.

The American College of Surgeons

Is to meet in Chicago, October 22-26, the week immediately following that in which the annual meeting of our State Society will be held. Dr. Albert J. Oschner and Dr. Franklin H. Martin, both of Chicago, are president and director general, respectively.

Dr. D. A. Stanton,

High Point, N. C., has been appointed a member of the North Carolina State Board of Health, to fill vacancy caused by resignation of Dr. F. R. Harris, of Henderson, N. C.

Dr. and Mrs. W. J. Knight

And daughters, Newport News, Va., enjoyed a motor trip in North Carolina in August.

Dr. and Mrs. Ashby Turner,

Harrisonburg, Va., went with some friends on a motor trip to Canada and points of interest in the north, last month.

"Venereal Disease Information,"

A monthly publication, has just made its appearance in magazine form, and is intended primarily for health officers, physicians, nurses and social workers engaged in venereal disease control activities. It is issued by the U. S. Public Health Service, and the price is 50 cents per year, payable to the Superintendent of Documents, Government Printing Office, Washington, D. C.

See notice under secretary's announcements covering reduced rates to meeting in Roanoke. The reductions apply to dependent members of physicians' families in addition to members.

For Sale.

Tidewater Virginia beautiful home and good practice in town of 1,200, with rich surrounding country. Practice will pay for property in a year. Cash required to handle $2,500. Reason for selling, going to specialize.

If you want a good opportunity and can manage, address No. 273, care this journal.

Obituary

Dr. George Nicholas Acker,

Of Washington, D. C., died from pneumonia July 22. He was 70 years of age and a graduate of the Medical Department of Columbian University, Washington, in 1874. He was for sometime professor of pediatrics at George Washington University Medical School, Washington, D. C.

Dr. James Semple Haile,

Of Chatham, Va., died in Danville, Va., August 12. He was sixty-nine years of age and was formerly a member of the Medical Society of Virginia. Dr. Haile graduated from the University of Maryland, School of Medicine, Baltimore, in 1886, and practiced in Chatham until a few years ago when he retired.

Dr. Cowles M. Vaiden

Died at his home, at Ruthville, Va., August 14, in his fifty-sixth year. He graduated from the Medical College of Virginia, Richmond, in 1892, and was for a time a member of the Medical Society of Virginia. He is survived by a daughter, a sister and two brothers.

Dr. Elijah Filmore Truitt,

Formerly a member of the Medical Society of Virginia, died at his home in Norfolk, Va., September 2. He graduated in medicine from the College of Physicians and Surgeons, Baltimore, in 1883, and was at one time Norfolk County coroner. Dr. Truitt was also a druggist and a pioneer in the establishment of chain drug stores in Norfolk.

Dr. Samuel Major Hodes,

Formerly of Richmond, died August 22, and the interment was made in this city. He was thirty-five years of age and a graduate from the Medical College of Virginia in 1915. Dr. Hodes was at one time a member of the Medical Society of Virginia.